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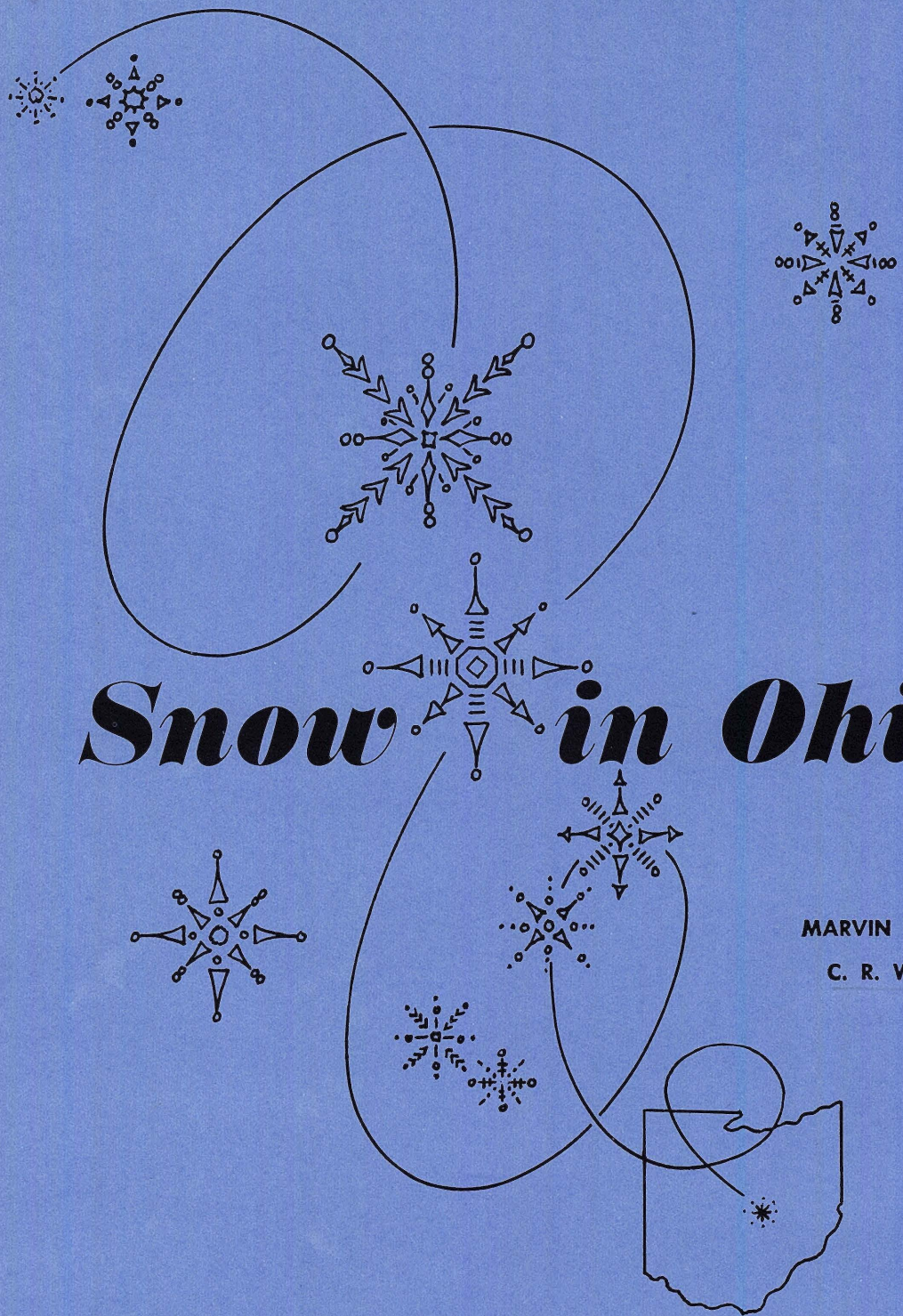

Snow in Ohio

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OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER
Wooster, Ohio

CONTENTS

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MARVIN E. MILLER and C. R. WEAVER[1]

INTRODUCTION

Snow influences the economy of Ohio in many ways. It not only serves as a protective cover to vegetation but it also provides moisture for the annual *winter recharge* of soils, wells, and above-ground water storage facilities. Winter resorts need nature's snows to provide for more economical operation of ski slopes. Of course, the adverse effects of snow relate mostly to hazardous street and highway conditions.

Using the best and most complete snowfall records available for Ohio, this report provides information on: mean monthly and annual snowfall amounts; frequency of selected snowfalls; threshold dates of first 1-, 3-, and 4-inch snowfalls of the winter season; duration of snow cover; extreme snowfalls and snow depths; and some notable snowstorms or unusually snowy winters.

TOPOGRAPHY AND SNOWFALL

Topography plays a vital role in explaining much of the variation in snowfall in Ohio. The state is bounded on the north by Lake Erie, the average surface of which is 572 feet above mean sea level. Along the Ohio-Pennsylvania border, the mean elevation is about 1050 feet but this lowers to about 650 feet at the point where the Ohio River crosses the Pennsylvania line. The elevation of the Ohio River near Cincinnati is 430 feet mean sea level (msl). In general, the northwest part of the state is very flat and the southeast is very rough and hilly. Mean elevation of northeast Ohio is about 300 feet higher than the northwest and north central areas.

Elevation changes abruptly in three distinct areas of Ohio. One is east of Cleveland along the Lake Erie shoreline where in a distance of 12 miles areas near Chardon (Geauga County) rise 690 feet higher than the mean level of Lake Erie. Portions of Clinton and Highland counties in the southwest are at elevations of 1050 to 1100 feet. These areas are only 30 to 40 miles from the Ohio River (500 ft. msl). Below Columbus, the Scioto River Valley gradually narrows, reaching a width of about 2 miles near Chillicothe. From this point southward to the Ohio River at Portsmouth, the width of the Scioto River Valley remains nearly constant. Hilltops on either side of the valley range upward to 500 feet above the river. Total precipitation, including snowfall, is slightly depressed in the Scioto River Valley, mainly because storms drop their heavier precipitation on the higher terrain which is mostly west of the valley.

The effect which topography plays on snowfall is especially noticeable in northeast Ohio. Locally heavy snowfall occurs along the Lake Erie shoreline east of Cleveland during every winter. These *lake-effect storms* are not associated with any major storm center but usually occur after a cold front passes across the area. With a general wind trajectory of west to northwest, the cold air picks up both heat and moisture as it moves across Lake Erie. When the shallow bands of clouds (3) reach shore, the air is forced to rise rather abruptly. In the process of rising, the air cools and is then unable to hold the moisture which it receives during its trip across the lake and the *extra* moisture falls as snow.

The difference in elevation between Lake Erie and land areas in the northeast reaches its peak near the boundary between Lake and Geauga counties. Snowfall from the lake-effect storms is also greatest in this area and because of this the general boundary area between Lake and Geauga counties is also the center or heart of Ohio's *snowbelt* counties.

MONTHLY AND SEASONAL SNOWFALL

Snow is the most capricious meteorological element which volunteer weather observers of the National Oceanic and Atmospheric Administration are asked to measure. As part of their once-daily weather observation program, volunteer observers record the melted equivalent of snow which has fallen during the past 24 hours,

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the amount of new snow which fell during the observation period, and the total depth of the frozen precipitation (snow, sleet, ice pellets, and/or ice) on the ground at observation time.

Melting, settling, drifting, and snow density are problems for all observers of snow. Consider, for example, a day when it snows for several hours and then changes to rain. The rain may either cause settling, thus increasing the snow density, and/or melt all or part of the new snow. For this case, how does the observer account for the snowfall which settled or was melted by the rain? If the observer takes his once daily observation at 5 p.m. and snow falls during the night but the sun comes out during the day and melts the snow, the observer is faced with the problem of how to estimate snow which fell within his observation period but is no longer present. In the above examples and numerous other cases not cited, the observer is faced with the difficult decision of accounting for all losses which occur to snow during each 24-hour period. Such personal judgments obviously affect statistics related to snowfall.

All available snowfall data (5) for the period 1936-1965 were used in determining the mean monthly and seasonal snowfall amounts given in Table 1. Figure 1 shows that most of central Ohio receives an average of 20 to 30 inches of snow a year, extreme northern Ohio receives from 30 to more than 100 inches, and extreme southern Ohio receives less than 20 inches. In general, seasonal snowfall increases from south to north, accompanying the lower temperatures which prevail there. In the northern half of Ohio, snowfall increases eastward and is associated with increased elevation and lake-effect storms.

The heaviest snowfall in Ohio occurs near Chardon in the heart of Ohio's snowbelt where a total of 106.1 inches is normal and 161.5 inches fell during the winter of 1959-1960. Two other cooperative weather stations, Dorset and Geneva, located in Ashtabula County and east of Chardon, have mean seasonal snowfalls of more than 70 inches. The Geneva observation site is located about 5 miles from Lake Erie while Dorset is nearly 16 miles southeast of the shoreline. The lake effect decreases markedly south of the ridgeline which parallels Lake Erie in the northeast. Snowfall decreases south of this ridgeline because the chilling effect of the sudden rise in elevation near the lake precipitates much of the available moisture.

The southernmost counties near the Ohio River receive an average of 13 to 17 inches of snow each winter. It is not a rare occurrence, however, for southern Ohio to receive more snowfall from an individual snowstorm than central or northern areas. This occurs most often when an intense low pressure center passes eastward through Kentucky or Tennessee.

Snowfall within the winter season and from season to season can and does vary greatly. Examples of the seasonal variation can be found by examining snowfall records from any location in the state. Such an examination reveals many cases where *snowy* winters follow or are followed by winters with little snowfall. The most dramatic example of this is the winter of 1917-1918 when the average statewide snowfall was slightly more than 46 inches but during the following winter of 1918-1919 the average snowfall for Ohio was about 6 inches.

Monthly comparisons of total snowfall during most winters would reveal a similar unpredictability concerning the distribution of snowfall within any winter season. However, when averaged with snowfall data for other years, the non-uniformity in distribution of snowfall within any single season becomes more uniform and even fairly symmetrical about January.

FREQUENCY OF SELECTED SNOWFALLS

The mean number of days each month and for the winter season with snowfalls equal or greater than 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 inches are given for 89 locations in Table 2. All available snowfall records (5) for the period 1936-1965 were used in calculating these means (n — 2 years of data were used in finding seasonal means).

Figure 2 shows the statewide distribution of mean number of days each winter with snowfalls equal to or greater than 1 inch. This figure shows that on the average there are three to seven times as many days with snowfalls equal to or greater than 1 inch in northeast Ohio than in extreme south central areas. Other areas north of about 40°N have twice as many days with snowfall equal to or greater than 1 inch, as do south central areas near the Ohio River. Topographic features rather than latitude differences are prime contributors to the high frequency of days with 1 inch or more of snow in northeast Ohio and the mini-centers of 10 plus days in southwest and southeast areas.

When all data for days with snowfalls of less than 8 inches as given in Table 2 are combined in their respective classes, they present a reasonably symmetrical picture, with slight skewness toward the spring months. While January shows

TABLE 1. — Mean Monthly and Seasonal Snowfall (Inches) for Selected Ohio Locations

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Season
Central									
Circleville	0.0	1.9	5.5	6.6	5.7	3.0	0.3	0.0	23.0
Columbus	0.1	3.1	6.4	7.0	6.3	5.1	0.6	0.0	28.6
Delaware	0.0	1.6	5.6	7.1	5.5	4.3	0.3	0.0	24.4
Irwin	0.0	1.8	6.3	5.7	4.1	4.1	0.4	0.0	22.4
Lancaster	0.0	2.6	6.4	6.9	6.2	4.2	0.2	0.0	26.5
London	0.0	2.0	5.1	6.2	4.8	3.4	0.3	0.0	21.8
Marion	0.0	2.1	4.9	5.5	6.2	4.8	0.4	0.0	23.9
Marysville	0.0	2.6	5.9	7.0	5.1	4.2	0.7	0.0	25.5
Newark	0.0	2.1	5.3	7.0	5.1	3.9	0.2	0.0	23.6
Washington C. H.	0.0	2.4	5.8	7.3	5.4	4.0	0.3	0.0	25.2
Central Hills									
Ashland	0.2	3.0	7.5	8.5	7.6	7.9	1.1	0.0	35.8
Centerburg	0.1	2.9	8.9	9.8	7.6	6.9	1.0	0.0	37.2
Charles Mill Dam	0.0	2.4	7.0	7.8	7.2	7.1	1.1	0.0	32.6
Coshocton	0.0	2.0	5.2	6.8	6.2	4.9	0.4	0.0	25.5
Fredericktown	0.0	2.6	7.2	7.7	6.3	6.2	0.6	0.0	30.6
Mansfield	0.1	2.1	8.4	9.6	11.5	8.9	1.4	0.0	42.2
Millersburg	0.0	2.4	5.5	7.1	6.0	5.2	0.7	0.0	26.9
Wooster	0.2	2.7	6.7	8.0	7.0	5.4	1.5	0.0	31.6
Northeast Hills									
Cadiz	0.2	3.1	8.2	10.3	8.8	6.6	1.8	0.0	39.0
Canfield	0.2	3.5	6.7	8.6	6.6	6.4	1.7	0.0	33.7
Dennison	0.0	2.7	6.0	8.0	6.8	4.9	0.3	0.0	28.7
Millport	0.1	3.0	6.4	7.6	5.9	6.1	1.2	0.0	30.3
Steubenville	0.1	4.4	9.0	9.4	8.6	7.9	2.1	0.0	41.5
Northeast									
Akron	0.6	5.5	10.1	10.1	9.2	9.5	2.5	0.2	47.7
Chardon	1.6	12.5	23.4	24.0	20.5	18.9	5.1	0.1	106.1
Chippewa Lake	0.2	3.7	7.9	8.8	8.8	8.5	1.9	0.0	39.8
Cleveland	0.7	5.6	10.6	10.3	10.8	10.3	2.2	0.0	50.5
Dorset	0.9	7.5	17.7	16.5	11.7	12.0	4.5	0.0	70.8
Geneva	0.8	11.0	21.0	16.2	10.7	10.3	2.3	0.0	72.3
Hiram	0.6	5.8	10.4	10.6	10.1	7.6	2.3	0.0	47.4
Painesville	0.7	6.9	14.7	12.4	10.4	10.2	1.5	0.0	56.8
Ravenna	0.6	6.2	10.8	8.9	8.0	9.0	2.0	0.2	45.7
Warren	0.5	5.2	9.9	10.6	9.9	9.8	1.9	0.0	47.8
Youngstown	0.6	6.6	12.7	12.7	10.9	11.2	2.7	0.2	57.6
Northwest									
Bowling Green	0.0	2.0	6.1	8.2	7.1	4.1	1.3	0.0	28.8*
Defiance	0.0	2.0	7.0	7.3	7.1	4.1	0.6	0.0	28.1*
Findlay	0.0	1.9	6.3	8.6	8.0	4.1	0.9	0.0	29.8*
Lima	0.0	1.7	7.0	9.5	6.9	3.7	0.9	0.0	29.7*
Montpelier	0.0	1.8	6.7	5.8	6.3	4.2	0.9	0.0	25.5*
Napoleon	0.0	1.9	7.0	8.0	7.3	4.6	0.8	0.0	29.6
Pandora	0.0	4.1	7.6	7.3	6.8	7.2	1.7	0.0	34.7
Paulding	0.0	1.6	6.0	7.4	6.1	4.3	0.8	0.0	26.2*
Toledo	0.0	3.2	7.2	8.3	8.2	7.3	1.9	0.0	36.1
Van Wert	0.0	2.3	6.4	7.7	6.7	5.3	1.6	0.0	30.0
Wauseon	0.0	3.0	6.6	7.6	7.7	5.5	1.5	0.0	31.9
North Central									
Bucyrus	0.0	2.6	6.2	7.7	7.2	5.5	0.8	0.0	30.0
Elyria	0.4	4.7	9.4	9.5	8.0	8.8	1.6	0.1	42.5
Fremont	0.0	1.8	7.7	9.1	7.3	4.2	1.0	0.0	31.1
Norwalk	0.2	2.2	6.8	7.5	6.5	4.8	1.2	0.0	29.2
Oberlin	0.0	3.0	7.6	9.5	9.0	7.1	1.2	0.0	37.4
Plymouth	0.0	2.3	6.4	7.9	6.8	6.4	1.0	0.0	30.8
Put In Bay	0.0	1.3	4.7	6.0	5.8	4.2	0.7	0.0	22.7
Sandusky	0.0	2.5	6.1	7.2	6.3	5.8	1.1	0.0	29.0
Tiffin	0.0	2.6	6.0	7.2	6.4	6.1	1.3	0.0	29.6
Upper Sandusky	0.0	2.9	6.3	6.9	5.0	5.8	1.0	0.0	27.9
West Central									
Bellefontaine	0.0	2.2	4.9	6.5	5.3	4.2	0.5	0.0	23.6
Celina	0.1	3.0	7.9	7.3	7.7	7.0	1.6	0.0	34.6
Greenville	0.0	1.2	5.2	6.3	5.3	3.6	0.4	0.0	22.0*
Kenton	0.0	1.6	5.4	6.2	5.1	4.4	0.8	0.0	23.5
Sidney	0.1	2.7	6.9	8.2	6.7	6.8	0.7	0.0	32.1
Springfield	0.2	2.7	6.9	6.8	5.2	5.4	1.2	0.0	28.4
Urbana	0.0	2.1	5.2	6.8	4.7	3.8	0.4	0.0	23.0
South Central									
Carpenter	0.0	2.1	3.6	5.5	5.7	3.1	0.1	0.0	20.1
Chillicothe	0.0	2.0	4.0	6.4	5.4	2.9	0.9	0.0	21.6
Gallipolis	0.0	2.0	3.4	5.8	4.4	3.4	0.3	0.0	19.3
Ironton	0.0	1.0	2.7	4.2	4.3	2.4	0.1	0.0	14.7
Jackson	0.0	2.5	4.6	6.7	5.4	4.2	0.4	0.0	23.8
Peebles	0.0	1.4	3.4	4.7	3.6	1.9	0.1	0.0	15.1
Portsmouth	0.0	1.4	3.0	4.7	3.7	1.9	0.1	0.0	14.8
Waverly	0.0	2.0	3.8	5.9	5.2	3.5	0.2	0.0	20.6
Southeast									
Athens	0.0	2.2	4.5	6.1	4.8	3.4	0.0	0.0	21.0
Barnesville	0.0	2.4	7.4	9.5	8.6	7.6	1.6	0.0	37.1
Caldwell	0.0	2.7	5.5	7.0	6.4	4.9	0.6	0.0	27.1
Cambridge	0.0	1.8	5.2	6.4	5.3	4.3	0.5	0.0	23.5
Marietta	0.0	3.0	4.5	6.9	5.0	3.5	0.4	0.0	23.3
McConnelsville	0.3	1.8	5.1	6.6	6.1	3.6	1.4	0.0	24.9
New Lexington	0.0	2.8	7.5	7.1	5.2	5.0	0.8	0.0	28.4
Philo	0.0	2.6	5.2	6.7	6.2	4.6	0.5	0.0	25.6
Senecaville Dam	0.0	2.9	6.4	7.7	5.7	5.2	0.8	0.0	28.7
Tom Jenkins Dam	0.1	2.3	5.7	8.7	6.6	5.1	0.6	0.0	29.1
Zanesville	0.0	2.7	5.5	5.8	5.0	4.6	0.2	0.0	23.8
Southwest									
Chilo	0.0	1.3	2.2	5.0	3.4	1.8	0.1	0.0	13.8
Cincinnati	0.1	1.6	4.1	5.4	4.2	3.3	0.5	0.0	19.2
Dayton	0.1	2.5	6.2	6.8	5.4	5.8	0.6	0.0	27.4
Eaton	0.3	2.6	5.7	7.6	5.3	5.3	0.0	0.0	26.8
Fernbank	0.0	1.6	3.3	6.5	3.7	2.9	0.1	0.0	18.1
Franklin	0.1	1.6	2.8	5.2	4.0	2.8	0.2	0.0	16.7
Hamilton	0.0	1.4	3.9	4.8	4.1	2.6	0.1	0.0	16.9
Hillsboro	0.1	1.5	4.6	6.3	5.5	3.6	0.6	0.0	22.1
Wilmington	0.1	3.4	7.4	9.5	7.3	5.7	1.1	0.0	34.5
Xenia	0.0	1.7	4.7	6.7	5.0	3.4	0.2	0.0	21.7

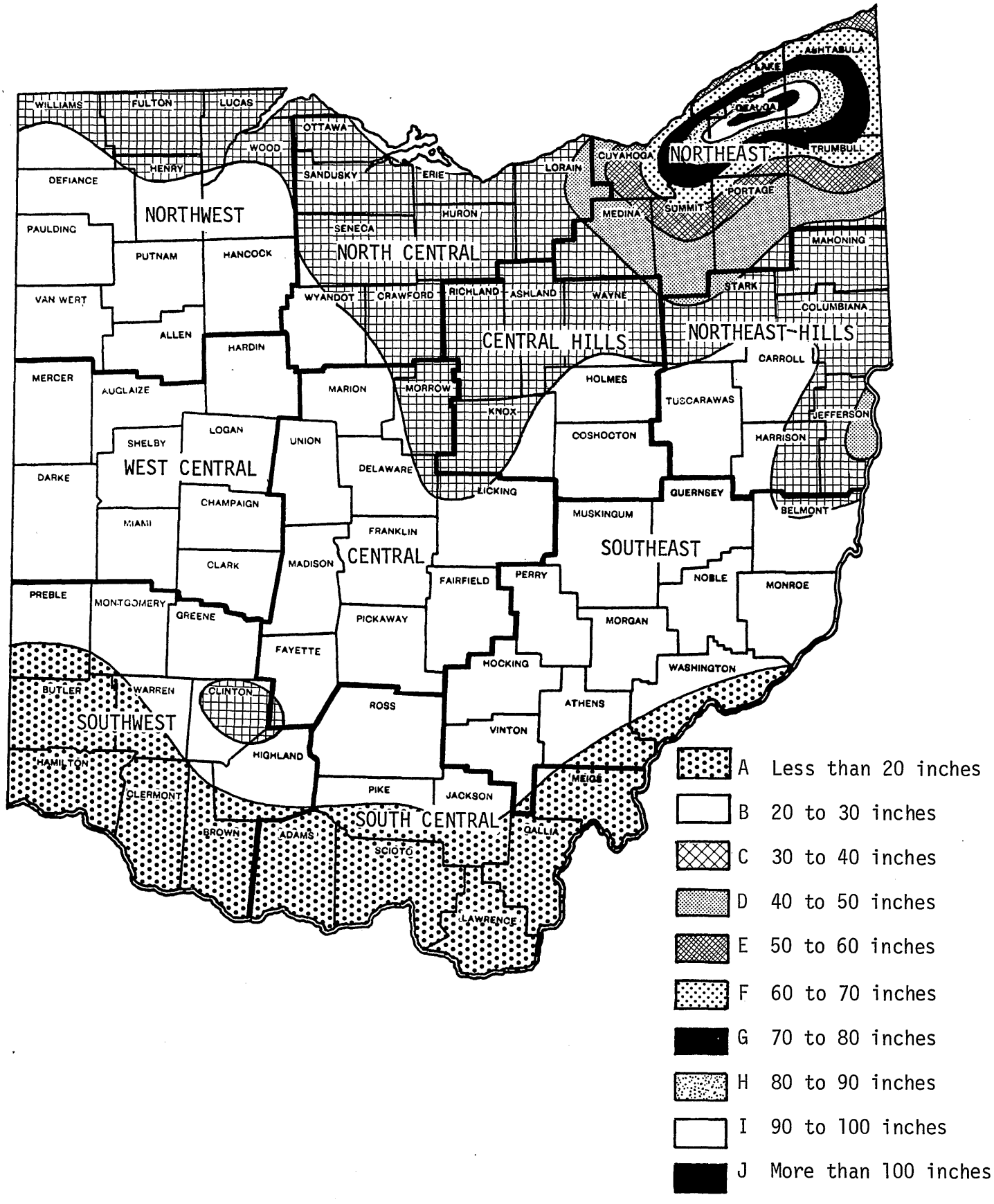

Fig. 1.—Mean snowfall for winter season (inches).

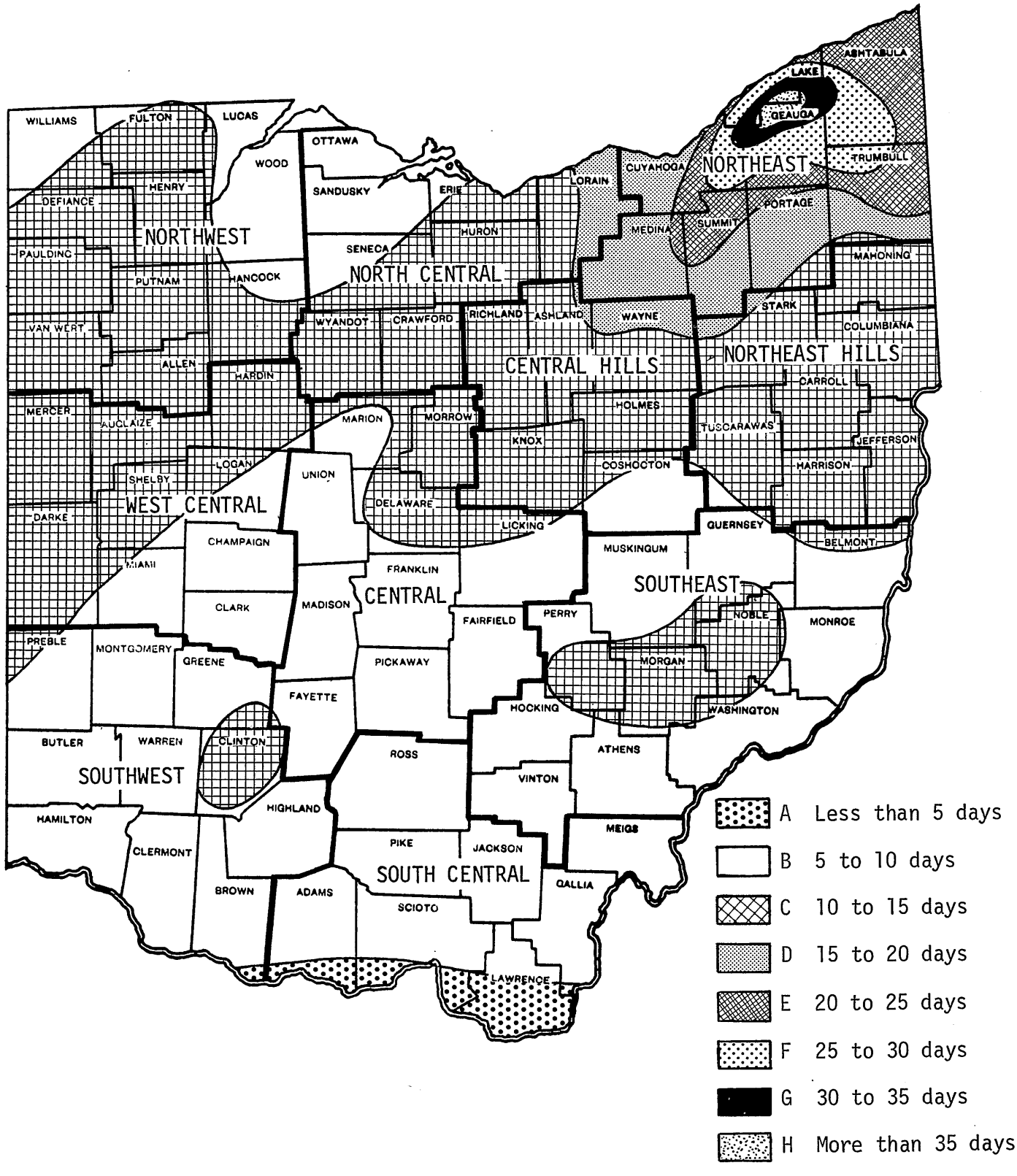

Fig. 2.—Mean number of days each winter with snowfall equal to or greater than 1 inch.

TABLE 2. – Mean Number of Days With Snowfall ≥ 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 Inches.

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
NORTHWEST				BOWLING GREEN				
00.5	0.00	0.70	2.20	2.30	2.30	1.47	0.13	9.11
01.0	0.00	0.47	1.53	1.87	1.70	1.03	0.13	6.75
02.0	0.00	0.37	0.80	1.10	1.03	0.57	0.13	4.07
04.0	0.00	0.10	0.27	0.23	0.17	0.10	0.07	0.93
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				DEFIANCE				
00.5	0.07	1.37	3.43	4.00	3.50	2.73	0.53	15.57
01.0	0.03	0.97	2.47	3.10	2.63	2.03	0.43	11.57
02.0	0.00	0.37	0.93	1.33	1.30	0.67	0.27	4.82
04.0	0.00	0.13	0.20	0.20	0.37	0.17	0.13	1.18
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				FINDLAY				
00.5	0.00	1.07	3.07	4.10	3.27	1.80	0.30	13.64
01.0	0.00	0.73	2.23	2.93	2.47	1.33	0.23	9.93
02.0	0.00	0.43	0.97	1.17	1.27	0.80	0.13	4.68
04.0	0.00	0.13	0.30	0.40	0.33	0.27	0.07	1.43
08.0	0.00	0.00	0.00	0.00	0.03	0.07	0.03	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				HOYTVILLE				
00.5	0.00	0.43	2.36	3.79	2.57	1.57	0.21	11.50
01.0	0.00	0.43	1.79	2.64	2.07	1.29	0.21	9.00
02.0	0.00	0.29	0.79	1.00	1.29	0.93	0.21	4.92
04.0	0.00	0.14	0.14	0.21	0.14	0.29	0.07	1.17
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.08
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				LIMA				
00.5	0.00	0.90	3.00	3.70	2.93	2.53	0.43	13.71
01.0	0.00	0.70	1.80	2.73	2.10	2.07	0.27	9.89
02.0	0.00	0.23	0.77	1.30	0.83	1.03	0.10	4.21
04.0	0.00	0.10	0.40	0.20	0.27	0.33	0.03	1.25
08.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07
12.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07
NORTHWEST				MONTPELIER				
00.5	0.00	0.70	2.27	2.77	2.83	1.67	0.27	9.86
01.0	0.00	0.47	1.77	2.33	2.27	1.23	0.23	8.00
02.0	0.00	0.30	0.93	1.23	1.23	0.57	0.17	4.18
04.0	0.00	0.13	0.40	0.37	0.50	0.23	0.10	1.71
08.0	0.00	0.03	0.03	0.00	0.03	0.03	0.03	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				NAPOLEON				
00.5	0.04	0.96	2.75	3.39	2.89	1.97	0.36	12.93
01.0	0.03	0.69	2.39	2.92	2.46	1.58	0.29	10.80
02.0	0.01	0.42	1.56	1.83	1.67	1.00	0.21	7.01
04.0	0.00	0.14	0.57	0.63	0.56	0.39	0.06	2.40
08.0	0.00	0.01	0.11	0.06	0.08	0.03	0.01	0.30
12.0	0.00	0.01	0.01	0.01	0.03	0.00	0.00	0.06
NORTHWEST				PANDORA				
00.5	0.06	2.12	4.29	4.12	3.71	3.24	0.88	18.93
01.0	0.00	1.35	2.65	2.35	2.65	2.24	0.59	12.33
02.0	0.00	0.59	1.29	1.00	1.53	0.94	0.24	5.73
04.0	0.00	0.35	0.47	0.24	0.24	0.41	0.12	1.93
08.0	0.00	0.06	0.00	0.06	0.00	0.12	0.00	0.20
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				PAULDING				
00.5	0.00	1.00	2.67	3.43	3.23	1.73	0.40	12.43
01.0	0.00	0.73	1.80	2.17	2.30	1.40	0.37	8.64
02.0	0.00	0.37	0.77	1.00	1.10	0.60	0.13	3.96
04.0	0.00	0.10	0.17	0.33	0.33	0.17	0.07	1.07
08.0	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
NORTHWEST				VAN WERT				
00.5	0.03	1.03	3.80	4.37	3.30	2.90	0.83	16.14
01.0	0.03	0.83	2.87	3.53	2.70	2.40	0.60	12.75
02.0	0.00	0.53	1.43	1.67	1.60	1.00	0.33	6.54
04.0	0.00	0.23	0.30	0.37	0.50	0.37	0.13	1.86
08.0	0.00	0.03	0.00	0.03	0.00	0.07	0.03	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHWEST				WAUSEON				
00.5	0.10	1.63	3.80	4.23	3.63	2.80	0.60	16.71
01.0	0.00	1.07	2.43	2.93	2.53	1.73	0.43	11.18
02.0	0.00	0.43	1.07	1.07	1.33	0.90	0.23	5.04
04.0	0.00	0.20	0.30	0.33	0.47	0.27	0.13	1.79
08.0	0.00	0.00	0.00	0.03	0.00	0.03	0.03	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTH CENTRAL				BUCYRUS				
00.5	0.03	1.07	3.40	4.00	3.53	2.57	0.43	14.79
01.0	0.03	1.03	2.87	3.37	2.97	2.30	0.40	12.75
02.0	0.00	0.57	1.60	1.93	1.80	1.30	0.23	7.43
04.0	0.00	0.17	0.40	0.53	0.40	0.47	0.07	2.00
08.0	0.00	0.07	0.03	0.03	0.10	0.03	0.00	0.25
12.0	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.07
NORTH CENTRAL				ELYRIA				
00.5	0.27	2.45	5.09	5.42	3.75	3.58	1.17	22.53
01.0	0.18	1.91	3.73	3.67	2.75	2.83	0.83	16.27
02.0	0.00	1.09	1.55	1.42	1.08	1.25	0.25	7.07
04.0	0.00	0.36	0.45	0.25	0.17	0.58	0.08	2.13
08.0	0.00	0.18	0.09	0.00	0.08	0.08	0.00	0.40
12.0	0.00	0.09	0.00	0.00	0.00	0.08	0.00	0.20
NORTH CENTRAL				FREMONT				
00.5	0.00	1.00	2.21	2.64	3.21	2.21	0.29	12.50
01.0	0.00	0.57	1.14	1.71	2.29	1.50	0.29	7.92
02.0	0.00	0.36	0.43	0.86	1.14	0.64	0.14	3.75
04.0	0.00	0.00	0.29	0.21	0.14	0.14	0.14	1.08
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTH CENTRAL				NORWALK				
00.5	0.08	1.17	3.61	4.10	3.39	2.39	0.66	15.54
01.0	0.06	0.69	2.55	2.86	2.41	1.85	0.48	11.00
02.0	0.06	0.41	1.49	1.51	1.27	1.07	0.28	6.07
04.0	0.01	0.20	0.46	0.42	0.55	0.37	0.08	2.10
08.0	0.00	0.03	0.06	0.07	0.03	0.03	0.00	0.22
12.0	0.00	0.00	0.01	0.03	0.00	0.03	0.00	0.07
NORTH CENTRAL				OBERLIN				
00.5	0.03	1.60	3.50	5.27	4.30	3.37	0.50	18.39
01.0	0.00	0.93	2.57	3.77	3.07	2.53	0.43	13.07
02.0	0.00	0.67	1.50	1.67	2.03	1.60	0.27	7.57
04.0	0.00	0.20	0.77	0.57	0.63	0.53	0.10	2.71
08.0	0.00	0.03	0.07	0.10	0.03	0.03	0.00	0.29
12.0	0.00	0.03	0.00	0.00	0.03	0.03	0.00	0.11
NORTH CENTRAL				PLYMOUTH				
00.5	0.00	1.13	3.50	4.73	3.97	2.83	0.60	16.86
01.0	0.00	0.73	1.93	2.83	2.40	1.77	0.37	10.04
02.0	0.00	0.43	0.93	1.07	1.27	0.97	0.17	4.86
04.0	0.00	0.13	0.33	0.30	0.20	0.43	0.07	1.39
08.0	0.00	0.00	0.07	0.03	0.03	0.10	0.00	0.25
12.0	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.07
NORTH CENTRAL				PUT IN BAY				
00.5	0.00	0.90	2.70	3.67	2.87	2.03	0.27	12.25
01.0	0.00	0.50	1.83	2.63	2.43	1.53	0.23	8.89
02.0	0.00	0.20	0.97	1.10	1.23	0.90	0.10	4.32
04.0	0.00	0.03	0.27	0.27	0.33	0.23	0.07	1.07
08.0	0.00	0.00	0.03	0.00	0.00	0.03	0.03	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04

TABLE 2 (cont.). — Mean Number of Days With Snowfall ≥ 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 Inches.

SNOW ≥	OCT	NOV	DEC	JAN	FEB	MAR	APR	SEASON
NORTH CENTRAL				SANDUSKY				
00.5	0.00	1.27	3.33	4.10	3.43	2.83	0.47	15.54
01.0	0.00	0.77	1.93	2.53	2.30	1.60	0.40	9.71
02.0	0.00	0.43	1.07	1.10	1.07	1.00	0.23	4.93
04.0	0.00	0.07	0.30	0.20	0.20	0.37	0.07	1.21
08.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
NORTH CENTRAL				TIFFIN				
00.5	0.03	1.57	3.10	4.07	3.33	2.60	0.63	15.39
01.0	0.03	0.90	1.83	2.50	2.30	1.87	0.43	9.89
02.0	0.00	0.37	0.83	1.13	1.07	1.20	0.17	4.71
04.0	0.00	0.13	0.40	0.40	0.30	0.43	0.10	1.79
08.0	0.00	0.00	0.00	0.07	0.00	0.00	0.03	0.07
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTH CENTRAL				UPPER SANDUSKY				
00.5	0.00	1.27	3.27	4.20	2.90	2.87	0.63	15.29
01.0	0.00	1.03	2.50	3.13	2.20	2.00	0.47	11.50
02.0	0.00	0.63	1.40	1.47	1.07	1.10	0.20	5.96
04.0	0.00	0.23	0.40	0.27	0.23	0.53	0.07	1.71
08.0	0.00	0.07	0.00	0.00	0.00	0.03	0.00	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
NORTHEAST				AKRON				
00.5	0.33	2.33	4.94	6.06	5.06	4.94	1.72	26.25
01.0	0.28	1.39	2.89	3.39	2.89	3.06	0.94	15.81
02.0	0.17	1.06	1.78	1.22	1.17	1.44	0.28	7.63
04.0	0.00	0.50	0.61	0.33	0.39	0.39	0.06	2.44
08.0	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.06
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHEAST				CHARDON				
00.5	0.40	4.40	9.25	10.05	8.70	7.90	2.55	44.17
01.0	0.35	3.75	7.45	8.00	7.15	6.05	1.75	35.11
02.0	0.30	2.60	5.15	4.75	4.85	4.00	0.90	22.72
04.0	0.10	1.20	2.00	1.85	1.65	1.70	0.30	9.28
08.0	0.10	0.20	0.45	0.50	0.30	0.40	0.10	2.11
12.0	0.05	0.10	0.10	0.10	0.05	0.00	0.00	0.39
NORTHEAST				CHIPPEWA LAKE				
00.5	0.13	2.07	4.63	5.57	5.27	3.80	1.23	23.04
01.0	0.13	1.57	3.23	4.07	4.07	3.23	1.10	17.75
02.0	0.03	0.93	1.67	2.07	2.17	2.03	0.53	9.57
04.0	0.03	0.20	0.43	0.47	0.40	0.77	0.10	2.29
08.0	0.00	0.07	0.07	0.07	0.03	0.03	0.00	0.29
12.0	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.04
NORTHEAST				DORSET				
00.5	0.50	3.30	9.30	8.50	6.50	6.50	2.40	36.63
01.0	0.50	2.50	7.00	6.00	4.60	4.90	1.90	26.38
02.0	0.20	1.40	3.30	3.00	2.20	1.80	0.90	12.25
04.0	0.00	0.50	1.20	1.10	0.60	0.90	0.20	4.25
08.0	0.00	0.20	0.00	0.20	0.00	0.10	0.10	0.38
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHEAST				GENEVA				
00.5	0.23	3.55	7.95	7.86	5.82	4.68	1.09	31.45
01.0	0.23	3.00	7.05	6.45	4.86	3.95	0.95	26.70
02.0	0.23	2.09	4.95	3.91	2.55	2.41	0.77	17.25
04.0	0.05	1.05	1.86	1.14	0.64	0.77	0.09	5.65
08.0	0.05	0.18	0.18	0.14	0.00	0.05	0.00	0.65
12.0	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.20
NORTHEAST				HIRAM				
00.5	0.24	2.74	5.58	6.14	5.74	4.13	1.28	25.96
01.0	0.15	1.88	4.17	4.44	4.32	3.13	0.99	19.17
02.0	0.11	1.26	2.19	2.10	2.24	1.46	0.46	9.80
04.0	0.07	0.36	0.71	0.57	0.46	0.56	0.17	2.89
08.0	0.03	0.11	0.06	0.06	0.03	0.04	0.01	0.34
12.0	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.06

SNOW ≥	OCT	NOV	DEC	JAN	FEB	MAR	APR	SEASON
NORTHEAST				MINERAL RIDGE				
00.5	0.15	1.54	4.19	5.04	4.50	3.85	0.81	19.71
01.0	0.12	1.15	2.92	3.27	3.35	2.73	0.62	14.00
02.0	0.08	0.54	1.35	1.54	1.38	1.54	0.23	6.71
04.0	0.00	0.12	0.38	0.35	0.35	0.58	0.04	1.79
08.0	0.00	0.08	0.04	0.04	0.00	0.12	0.00	0.29
12.0	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
NORTHEAST				PAINESVILLE				
00.5	0.19	2.56	6.69	5.75	4.81	4.00	0.56	25.07
01.0	0.19	1.88	5.75	4.75	4.19	3.56	0.50	21.43
02.0	0.13	1.13	2.69	2.44	2.31	1.88	0.31	11.14
04.0	0.06	0.44	1.25	0.69	0.94	1.00	0.13	4.71
08.0	0.06	0.19	0.13	0.13	0.00	0.13	0.00	0.71
12.0	0.00	0.13	0.00	0.00	0.00	0.06	0.00	0.21
NORTHEAST				RAVENNA				
00.5	0.28	2.89	5.89	5.17	4.67	4.94	1.28	25.81
01.0	0.22	2.11	4.17	3.00	3.33	3.11	0.89	17.81
02.0	0.17	1.22	2.11	1.44	1.39	1.56	0.33	8.81
04.0	0.06	0.39	0.44	0.39	0.28	0.50	0.06	2.31
08.0	0.00	0.11	0.00	0.06	0.06	0.06	0.00	0.25
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHEAST				WARREN				
00.5	0.30	2.47	6.00	6.53	5.87	4.67	1.17	27.18
01.0	0.20	1.73	3.97	4.33	4.33	3.37	0.70	18.61
02.0	0.10	1.03	2.00	2.07	1.97	1.83	0.40	9.32
04.0	0.03	0.47	0.63	0.47	0.50	0.83	0.13	3.04
08.0	0.00	0.07	0.03	0.07	0.07	0.10	0.00	0.32
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEST CENTRAL				BELLEFONTAINE				
00.5	0.03	1.27	3.13	3.90	3.33	2.10	0.50	14.36
01.0	0.03	0.80	2.33	2.40	2.17	1.60	0.27	9.61
02.0	0.00	0.37	1.10	1.17	0.93	0.97	0.07	4.61
04.0	0.00	0.17	0.20	0.40	0.30	0.30	0.03	1.36
08.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.04
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEST CENTRAL				CELINA				
00.5	0.20	1.50	4.50	4.20	4.50	4.30	0.80	20.50
01.0	0.10	1.00	2.60	2.50	2.70	2.20	0.50	11.88
02.0	0.00	0.40	1.30	1.10	1.20	0.90	0.20	5.88
04.0	0.00	0.30	0.30	0.10	0.30	0.50	0.10	1.63
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEST CENTRAL				GREENVILLE				
00.5	0.03	0.68	2.32	3.13	2.29	1.50	0.18	10.13
01.0	0.03	0.39	1.78	2.35	1.76	1.17	0.10	7.54
02.0	0.01	0.26	1.00	1.26	1.01	0.72	0.08	4.36
04.0	0.00	0.10	0.24	0.31	0.28	0.24	0.03	1.17
08.0	0.00	0.01	0.00	0.01	0.01	0.03	0.00	0.07
12.0	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
WEST CENTRAL				KENTON				
00.5	0.08	0.93	2.90	3.38	2.64	2.29	0.53	12.74
01.0	0.07	0.71	2.43	2.92	2.24	1.99	0.44	10.80
02.0	0.01	0.38	1.38	1.44	1.10	0.93	0.15	5.40
04.0	0.00	0.10	0.36	0.43	0.36	0.31	0.06	1.63
08.0	0.00	0.01	0.00	0.01	0.03	0.03	0.00	0.09
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WEST CENTRAL				SIDNEY				
00.5	0.14	1.43	3.79	4.36	3.64	3.29	0.36	17.42
01.0	0.07	1.00	2.36	2.86	2.21	2.36	0.21	11.33
02.0	0.00	0.57	1.29	1.71	1.14	1.36	0.07	6.33
04.0	0.00	0.14	0.36	0.43	0.43	0.50	0.07	2.17
08.0	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.08
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 2 (cont.). — Mean Number of Days With Snowfall ≥ 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 Inches.

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
WEST CENTRAL				SPRINGFIELD				
00.5	0.14	1.14	3.14	3.27	2.77	2.86	0.64	14.10
01.0	0.14	0.82	2.32	2.36	1.91	2.09	0.45	10.15
02.0	0.05	0.36	1.14	1.27	0.95	1.09	0.23	9.10
04.0	0.00	0.18	0.55	0.45	0.27	0.36	0.09	1.95
08.0	0.00	0.14	0.00	0.05	0.00	0.05	0.00	0.25
12.0	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05
WEST CENTRAL				URBANA				
00.5	0.07	0.83	2.67	3.37	2.77	2.10	0.33	12.07
01.0	0.03	0.60	2.03	2.67	1.87	1.50	0.30	9.18
02.0	0.00	0.37	1.13	1.47	0.97	0.77	0.03	4.68
04.0	0.00	0.20	0.27	0.33	0.20	0.27	0.03	1.32
08.0	0.00	0.03	0.07	0.07	0.00	0.00	0.00	0.18
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
CENTRAL				CIRCLEVILLE				
00.5	0.04	0.75	2.50	2.67	2.54	1.54	0.17	10.68
01.0	0.04	0.54	1.71	2.00	1.67	1.13	0.08	7.55
02.0	0.00	0.42	0.96	1.13	0.71	0.63	0.04	4.09
04.0	0.00	0.13	0.29	0.33	0.13	0.13	0.04	1.05
08.0	0.00	0.04	0.08	0.00	0.04	0.00	0.00	0.18
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				COLUMBUS CITY				
00.5	0.08	0.79	2.29	3.28	2.84	1.96	0.32	11.32
01.0	0.04	0.52	1.41	2.17	1.69	1.17	0.17	7.08
02.0	0.00	0.25	0.76	1.00	0.88	0.53	0.09	3.45
04.0	0.00	0.09	0.16	0.32	0.36	0.09	0.01	1.01
08.0	0.00	0.00	0.00	0.01	0.01	0.03	0.00	0.05
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				DELAWARE				
00.5	0.03	1.00	3.00	4.00	3.53	2.33	0.27	14.18
01.0	0.03	0.63	2.30	2.90	2.37	1.67	0.23	10.25
02.0	0.00	0.33	1.00	1.77	1.27	0.97	0.10	5.50
04.0	0.00	0.10	0.47	0.37	0.27	0.23	0.00	1.43
08.0	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.07
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
CENTRAL				IRWIN				
00.5	0.04	0.71	2.54	2.58	2.54	2.00	0.29	10.95
01.0	0.04	0.63	2.29	2.38	2.13	1.75	0.21	9.55
02.0	0.00	0.29	1.42	1.46	1.00	0.67	0.08	5.05
04.0	0.00	0.17	0.46	0.42	0.08	0.29	0.00	1.45
08.0	0.00	0.04	0.04	0.00	0.00	0.08	0.00	0.18
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				LANCASTER				
00.5	0.03	1.03	2.90	3.40	3.43	2.10	0.17	12.86
01.0	0.00	0.87	2.30	2.77	2.37	1.40	0.10	9.57
02.0	0.00	0.53	1.07	1.40	1.17	0.83	0.03	5.00
04.0	0.00	0.27	0.50	0.43	0.43	0.27	0.00	1.79
08.0	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.07
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				LONDON				
00.5	0.07	1.13	2.90	3.43	2.73	2.07	0.30	12.54
01.0	0.07	0.63	2.10	2.50	1.93	1.50	0.17	8.86
02.0	0.00	0.43	0.90	1.37	1.03	0.67	0.07	4.46
04.0	0.00	0.13	0.37	0.37	0.33	0.20	0.03	1.46
08.0	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.04
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				MARION				
00.5	0.03	1.30	2.97	3.27	3.80	2.57	0.37	14.21
01.0	0.00	0.80	1.93	2.17	2.53	1.70	0.20	9.46
02.0	0.00	0.37	1.03	1.17	1.37	1.03	0.07	5.07
04.0	0.00	0.13	0.27	0.20	0.37	0.23	0.00	1.18
08.0	0.00	0.03	0.00	0.07	0.00	0.03	0.00	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
CENTRAL				MARYSVILLE				
00.5	0.03	1.07	3.00	3.90	3.20	2.27	0.47	14.04
01.0	0.00	0.87	1.90	2.67	2.13	1.53	0.40	9.46
02.0	0.00	0.50	1.10	1.47	1.00	1.00	0.10	5.14
04.0	0.00	0.17	0.53	0.37	0.23	0.27	0.07	1.61
08.0	0.00	0.03	0.07	0.07	0.00	0.00	0.00	0.18
12.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07
CENTRAL				NEWARK				
00.5	0.03	1.17	2.80	3.63	2.83	1.73	0.20	12.43
01.0	0.03	0.87	2.20	2.63	1.97	1.37	0.17	9.18
02.0	0.00	0.47	1.10	1.50	0.93	0.70	0.03	4.64
04.0	0.00	0.10	0.20	0.53	0.33	0.30	0.00	1.46
08.0	0.00	0.00	0.03	0.07	0.03	0.07	0.00	0.21
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL				WASHINGTON C. H.				
00.5	0.03	0.87	2.53	3.27	3.23	1.93	0.20	12.07
01.0	0.03	0.67	2.07	2.67	2.10	1.50	0.10	9.11
02.0	0.00	0.50	1.43	1.60	1.10	0.90	0.03	5.57
04.0	0.00	0.20	0.50	0.50	0.30	0.20	0.00	1.68
08.0	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.11
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
CENTRAL HILLS				ASHLAND				
00.5	0.10	1.53	4.20	5.43	4.90	3.77	0.93	20.82
01.0	0.10	1.13	2.73	3.57	3.30	2.87	0.60	14.21
02.0	0.07	0.53	1.43	1.30	1.40	1.50	0.20	6.36
04.0	0.00	0.20	0.47	0.50	0.30	0.60	0.00	2.04
08.0	0.00	0.00	0.03	0.00	0.03	0.10	0.00	0.21
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
CENTRAL HILLS				CENTERBURG				
00.5	0.13	1.73	4.00	5.20	4.00	3.13	0.87	20.38
01.0	0.07	1.13	3.13	4.27	3.07	2.53	0.60	15.85
02.0	0.00	0.60	2.00	2.20	1.87	1.33	0.07	8.46
04.0	0.00	0.13	0.73	0.47	0.20	0.60	0.00	2.08
08.0	0.00	0.00	0.07	0.00	0.00	0.07	0.00	0.15
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL HILLS				CHARLES MILL DAM				
00.5	0.04	1.48	3.67	4.56	4.33	3.37	0.89	18.36
01.0	0.00	1.15	3.19	3.44	3.44	2.67	0.74	14.92
02.0	0.00	0.41	1.37	1.56	1.56	1.44	0.22	6.52
04.0	0.00	0.15	0.44	0.19	0.37	0.48	0.00	1.60
08.0	0.00	0.00	0.07	0.07	0.00	0.04	0.00	0.20
12.0	0.00	0.00	0.00	0.04	0.00	0.04	0.00	0.08
CENTRAL HILLS				COSHOCTON				
00.5	0.00	0.90	2.60	3.30	2.90	2.60	0.23	12.39
01.0	0.00	0.60	1.80	2.27	2.27	1.83	0.20	8.71
02.0	0.00	0.37	0.90	1.27	1.17	0.80	0.10	4.43
04.0	0.00	0.17	0.27	0.53	0.40	0.27	0.00	1.57
08.0	0.00	0.03	0.03	0.03	0.03	0.10	0.00	0.25
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
CENTRAL HILLS				FREDERICKTOWN				
00.5	0.11	1.53	3.58	4.47	3.47	3.74	0.58	18.18
01.0	0.05	1.21	2.37	3.21	2.68	2.63	0.37	13.06
02.0	0.00	0.63	1.47	1.63	1.68	1.26	0.11	7.00
04.0	0.00	0.16	0.53	0.47	0.32	0.42	0.00	1.82
08.0	0.00	0.00	0.11	0.00	0.05	0.05	0.00	0.24
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CENTRAL HILLS				MILLERSBURG				
00.5	0.03	1.13	2.67	3.67	3.43	2.57	0.53	13.86
01.0	0.03	0.97	2.20	2.93	2.63	2.00	0.30	10.82
02.0	0.03	0.57	1.17	1.43	1.13	1.03	0.20	5.46
04.0	0.00	0.10	0.40	0.30	0.37	0.23	0.00	1.36
08.0	0.00	0.03	0.00	0.07	0.03	0.03	0.00	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04

TABLE 2 (cont.). — Mean Number of Days With Snowfall ≥ 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 Inches.

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
CENTRAL HILLS				WOOSTER				
00.5	0.13	1.39	3.19	4.24	3.67	2.78	0.88	18.01
01.0	0.11	0.75	2.31	2.74	2.42	1.74	0.50	11.80
02.0	0.06	0.38	1.11	1.51	1.19	0.85	0.24	6.04
04.0	0.03	0.13	0.29	0.44	0.39	0.17	0.13	1.84
08.0	0.00	0.04	0.06	0.06	0.03	0.04	0.03	0.27
12.0	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.04
NORTHEAST HILLS				CADIZ				
00.5	0.11	1.27	3.79	4.77	4.29	3.21	0.97	18.45
01.0	0.08	1.02	2.81	3.50	3.29	2.45	0.71	13.83
02.0	0.05	0.56	1.63	1.90	1.63	1.21	0.32	7.28
04.0	0.02	0.16	0.55	0.69	0.50	0.45	0.10	2.55
08.0	0.00	0.06	0.05	0.06	0.05	0.00	0.02	0.25
12.0	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
NORTHEAST HILLS				CANFIELD				
00.5	0.18	1.82	3.96	4.78	3.96	3.22	0.86	18.88
01.0	0.10	1.26	2.66	3.46	2.54	2.10	0.62	12.79
02.0	0.06	0.58	1.26	1.50	1.10	1.26	0.40	6.10
04.0	0.00	0.26	0.28	0.40	0.40	0.38	0.10	1.73
08.0	0.00	0.02	0.02	0.06	0.00	0.04	0.00	0.13
12.0	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02
NORTHEAST HILLS				DENNISON				
00.5	0.07	1.17	3.13	4.33	3.87	2.43	0.30	15.43
01.0	0.03	0.87	2.33	3.23	2.90	1.83	0.23	11.43
02.0	0.03	0.57	1.07	1.67	1.40	1.03	0.03	5.96
04.0	0.00	0.23	0.37	0.40	0.27	0.30	0.00	1.54
08.0	0.00	0.03	0.03	0.07	0.03	0.07	0.00	0.21
12.0	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
NORTHEAST HILLS				MILLPORT				
00.5	0.07	1.47	3.03	4.50	3.40	3.20	0.97	16.61
01.0	0.07	1.07	2.40	3.13	2.40	2.33	0.53	11.71
02.0	0.07	0.50	1.53	1.70	1.30	1.17	0.20	6.32
04.0	0.00	0.27	0.43	0.43	0.27	0.40	0.07	1.82
08.0	0.00	0.07	0.00	0.03	0.03	0.10	0.00	0.25
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NORTHEAST HILLS				STEUBENVILLE				
00.5	0.22	1.54	4.88	5.29	4.83	4.08	1.33	23.00
01.0	0.09	1.13	3.17	3.33	3.13	2.79	0.96	14.95
02.0	0.00	0.75	1.71	2.00	1.83	1.46	0.38	8.18
04.0	0.00	0.25	0.42	0.25	0.46	0.42	0.13	1.86
08.0	0.00	0.13	0.13	0.13	0.04	0.13	0.04	0.59
12.0	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.09
SOUTHWEST				CHILO				
00.5	0.00	0.71	1.25	3.25	2.11	1.07	0.11	8.62
01.0	0.00	0.36	0.96	2.04	1.43	0.75	0.07	5.85
02.0	0.00	0.29	0.50	0.89	0.64	0.43	0.04	2.96
04.0	0.00	0.07	0.11	0.29	0.14	0.11	0.00	0.77
08.0	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.08
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				CINCINNATI				
00.5	0.04	0.71	2.14	2.49	2.18	1.45	0.24	9.27
01.0	0.04	0.51	1.39	1.65	1.57	1.04	0.16	6.37
02.0	0.04	0.31	0.67	0.96	0.76	0.51	0.08	3.31
04.0	0.00	0.08	0.22	0.29	0.18	0.14	0.02	0.84
08.0	0.00	0.04	0.02	0.04	0.02	0.02	0.00	0.14
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				DAYTON				
00.5	0.00	0.69	2.35	3.28	2.56	1.59	0.09	10.60
01.0	0.00	0.44	1.61	2.09	1.78	1.19	0.03	7.10
02.0	0.00	0.22	0.94	1.03	0.81	0.59	0.03	8.70
04.0	0.00	0.13	0.32	0.31	0.09	0.03	0.00	0.90
08.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SNOW ≥	OCT	NOV	DEC	DAYS JAN	FEB	MAR	APR	SEASON
SOUTHWEST				EATON				
00.5	0.09	0.82	3.09	3.27	3.00	2.45	0.00	12.89
01.0	0.09	0.82	2.27	2.91	1.91	2.00	0.00	9.89
02.0	0.09	0.45	1.55	1.73	1.18	1.27	0.00	6.22
04.0	0.00	0.18	0.18	0.36	0.27	0.55	0.00	1.67
08.0	0.00	0.09	0.00	0.09	0.00	0.00	0.00	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				FERNBANK DAM				
00.5	0.00	0.81	2.25	3.19	1.88	1.44	0.06	9.64
01.0	0.00	0.56	1.13	2.19	1.19	1.06	0.06	6.29
02.0	0.00	0.31	0.69	1.50	0.94	0.56	0.06	4.14
04.0	0.00	0.19	0.13	0.38	0.31	0.31	0.00	1.36
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				FRANKLIN				
00.5	0.07	0.86	1.86	2.71	2.43	1.43	0.14	10.00
01.0	0.07	0.57	1.36	2.21	1.79	1.14	0.07	7.50
02.0	0.00	0.29	0.29	1.00	0.93	0.57	0.07	3.17
04.0	0.00	0.14	0.14	0.29	0.14	0.21	0.00	1.00
08.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				HAMILTON				
00.5	0.03	0.63	1.93	2.60	2.10	1.30	0.07	8.43
01.0	0.03	0.27	1.30	1.57	1.63	0.93	0.03	5.68
02.0	0.03	0.17	0.80	0.93	1.00	0.57	0.03	3.50
04.0	0.00	0.13	0.37	0.37	0.27	0.20	0.03	1.36
08.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHWEST				HILLSBORO				
00.5	0.06	0.79	2.32	3.04	2.82	1.81	0.30	11.29
01.0	0.06	0.54	1.63	2.21	2.11	1.35	0.21	8.17
02.0	0.04	0.25	0.85	1.38	1.14	0.79	0.11	4.60
04.0	0.01	0.07	0.32	0.43	0.35	0.28	0.06	1.54
08.0	0.00	0.01	0.03	0.04	0.07	0.03	0.00	0.19
12.0	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
SOUTHWEST				WILMINGTON				
00.5	0.10	1.97	4.23	5.43	4.60	3.60	0.97	20.96
01.0	0.07	1.13	3.03	3.60	2.93	2.13	0.43	13.54
02.0	0.03	0.63	1.50	1.93	1.47	1.13	0.17	6.96
04.0	0.03	0.20	0.43	0.63	0.37	0.43	0.03	2.07
08.0	0.00	0.07	0.07	0.07	0.03	0.03	0.00	0.29
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
SOUTHWEST				XENIA				
00.5	0.03	0.63	2.33	2.93	2.60	1.60	0.17	10.25
01.0	0.03	0.40	1.70	2.43	1.87	1.37	0.10	7.71
02.0	0.03	0.23	1.07	1.33	1.10	0.83	0.07	4.54
04.0	0.00	0.13	0.27	0.47	0.17	0.23	0.03	1.29
08.0	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
SOUTHCENTRAL				CARPENTER				
00.5	0.00	0.89	2.18	3.32	2.86	1.68	0.18	11.27
01.0	0.00	0.61	1.50	1.93	2.14	1.43	0.07	7.92
02.0	0.00	0.46	0.75	1.11	1.11	0.68	0.00	4.23
04.0	0.00	0.21	0.21	0.43	0.36	0.11	0.00	1.42
08.0	0.00	0.04	0.04	0.04	0.11	0.04	0.00	0.27
12.0	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04
SOUTHCENTRAL				CHILLICOTHE				
00.5	0.00	0.77	1.77	2.77	2.57	1.60	0.17	9.32
01.0	0.00	0.57	1.30	1.90	1.60	1.00	0.07	6.32
02.0	0.00	0.40	0.57	0.93	0.77	0.53	0.03	3.21
04.0	0.00	0.13	0.23	0.27	0.30	0.27	0.00	1.25
08.0	0.00	0.03	0.00	0.07	0.03	0.00	0.00	0.14
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04

TABLE 2 (cont.). — Mean Number of Days With Snowfall ≥ 0.5, 1.0, 2.0, 4.0, 8.0, and 12.0 Inches.

SNOW ≥	OCT	NOV	DEC	JAN	FEB	MAR	APR	SEASON
SOUTHCENTRAL				GALLIPOLIS				
00.5	0.00	0.77	2.13	3.20	2.53	2.03	0.33	10.86
01.0	0.00	0.63	1.43	2.27	1.87	1.53	0.27	7.82
02.0	0.00	0.30	0.53	1.07	0.73	0.53	0.03	3.18
04.0	0.00	0.17	0.20	0.27	0.20	0.20	0.00	0.96
08.0	0.00	0.03	0.03	0.03	0.07	0.03	0.00	0.18
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHCENTRAL				IRONTON				
00.5	0.00	0.51	1.44	2.10	2.03	1.11	0.15	7.23
01.0	0.00	0.31	0.88	1.54	1.49	0.82	0.08	4.99
02.0	0.00	0.15	0.44	0.89	0.88	0.44	0.01	2.79
04.0	0.00	0.11	0.18	0.21	0.26	0.15	0.01	0.91
08.0	0.00	0.01	0.01	0.03	0.04	0.01	0.00	0.11
12.0	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
SOUTHCENTRAL				JACKSON				
00.5	0.00	0.83	2.57	3.00	2.70	2.03	0.30	11.36
01.0	0.00	0.70	2.07	2.37	2.17	1.40	0.20	8.75
02.0	0.00	0.47	0.77	1.27	1.17	0.87	0.07	4.57
04.0	0.00	0.17	0.23	0.70	0.30	0.33	0.00	1.75
08.0	0.00	0.03	0.00	0.07	0.03	0.03	0.00	0.14
12.0	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.04
SOUTHCENTRAL				PEEBLES				
00.5	0.00	0.67	1.77	2.43	2.03	1.13	0.13	7.68
01.0	0.00	0.53	1.37	1.93	1.53	0.83	0.10	5.86
02.0	0.00	0.33	0.77	1.03	0.80	0.43	0.00	3.21
04.0	0.00	0.13	0.20	0.33	0.13	0.07	0.00	0.89
08.0	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.07
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHCENTRAL				PORTSMOUTH				
00.5	0.00	0.73	1.40	2.50	1.80	0.97	0.13	7.18
01.0	0.00	0.47	1.00	1.73	1.33	0.67	0.10	5.04
02.0	0.00	0.30	0.67	0.87	0.77	0.40	0.00	2.93
04.0	0.00	0.13	0.23	0.17	0.17	0.13	0.00	0.82
08.0	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.07
12.0	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.04
SOUTHCENTRAL				WAVERLY				
00.5	0.00	0.73	2.17	2.80	2.43	1.70	0.13	9.75
01.0	0.00	0.53	1.50	2.37	1.90	1.13	0.10	7.29
02.0	0.00	0.33	0.70	1.27	1.03	0.63	0.10	4.00
04.0	0.00	0.23	0.23	0.30	0.30	0.33	0.00	1.43
08.0	0.00	0.03	0.07	0.03	0.03	0.00	0.00	0.18
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHEAST				ATHENS				
00.5	0.00	0.97	2.47	2.77	2.48	1.87	0.10	10.54
01.0	0.00	0.80	1.87	2.20	1.72	1.40	0.07	7.96
02.0	0.00	0.43	1.00	1.40	0.86	0.77	0.00	4.39
04.0	0.00	0.13	0.27	0.47	0.24	0.20	0.00	1.29
08.0	0.00	0.03	0.10	0.07	0.07	0.00	0.00	0.29
12.0	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.07
SOUTHEAST				BARNESVILLE				
00.5	0.04	1.12	3.35	3.96	3.31	2.77	0.65	14.46
01.0	0.04	0.77	2.04	2.73	2.04	1.85	0.38	9.38
02.0	0.04	0.31	1.27	1.23	1.35	1.08	0.19	5.42
04.0	0.00	0.15	0.23	0.35	0.27	0.31	0.04	1.42
08.0	0.00	0.08	0.04	0.04	0.08	0.08	0.00	0.29
12.0	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
SOUTHEAST				CALDWELL				
00.5	0.00	1.00	2.30	2.73	2.83	1.87	0.40	11.14
01.0	0.00	0.97	2.07	2.67	2.40	1.67	0.33	10.07
02.0	0.00	0.50	1.43	1.63	1.30	1.17	0.13	6.14
04.0	0.00	0.27	0.50	0.57	0.57	0.47	0.03	2.36
08.0	0.00	0.03	0.03	0.07	0.07	0.00	0.00	0.18
12.0	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00

SNOW ≥	OCT	NOV	DEC	JAN	FEB	MAR	APR	SEASON
SOUTHEAST				CAMBRIDGE				
00.5	0.03	0.77	2.37	2.93	2.53	1.77	0.33	10.64
01.0	0.03	0.57	2.07	2.43	1.80	1.43	0.27	8.50
02.0	0.03	0.33	1.27	1.30	0.97	0.93	0.13	4.86
04.0	0.00	0.17	0.37	0.53	0.40	0.37	0.00	1.79
08.0	0.00	0.03	0.00	0.03	0.10	0.00	0.00	0.14
12.0	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.04
SOUTHEAST				MARIETTA				
00.5	0.00	1.11	2.56	3.44	3.00	2.00	0.33	12.50
01.0	0.00	0.89	2.11	2.44	1.89	1.61	0.22	9.25
02.0	0.00	0.56	0.94	1.67	0.78	0.78	0.06	4.88
04.0	0.00	0.28	0.39	0.61	0.39	0.17	0.00	1.81
08.0	0.00	0.11	0.00	0.00	0.06	0.06	0.00	0.25
12.0	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.06
SOUTHEAST				MCCONNELSVILLE				
00.5	0.15	1.00	3.13	3.65	3.46	2.10	0.53	14.14
01.0	0.08	0.72	2.03	2.49	2.14	1.28	0.44	9.21
02.0	0.06	0.36	0.99	1.35	1.26	0.79	0.22	5.06
04.0	0.03	0.10	0.31	0.43	0.35	0.25	0.08	1.57
08.0	0.00	0.01	0.03	0.07	0.07	0.00	0.04	0.21
12.0	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.04
SOUTHEAST				NEW LEXINGTON				
00.5	0.04	1.17	3.42	3.75	3.13	2.46	0.38	14.55
01.0	0.04	0.88	2.50	2.54	2.00	1.50	0.33	10.14
02.0	0.04	0.58	1.38	1.21	0.88	0.83	0.25	5.45
04.0	0.00	0.17	0.63	0.33	0.17	0.33	0.00	1.77
08.0	0.00	0.08	0.04	0.08	0.04	0.04	0.00	0.32
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHEAST				PHILO				
00.5	0.03	1.17	2.70	3.37	3.00	2.07	0.30	12.39
01.0	0.00	0.83	1.70	2.23	2.03	1.47	0.23	8.18
02.0	0.00	0.40	1.00	1.23	0.90	0.80	0.07	4.32
04.0	0.00	0.17	0.33	0.43	0.40	0.23	0.00	1.54
08.0	0.00	0.03	0.03	0.00	0.00	0.03	0.00	0.11
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOUTHEAST				SENECAVILLE				
00.5	0.04	1.27	2.96	4.00	3.27	2.62	0.58	14.54
01.0	0.04	1.15	2.77	3.58	2.85	2.42	0.46	13.25
02.0	0.00	0.54	1.50	1.77	1.04	1.19	0.12	6.13
04.0	0.00	0.23	0.50	0.58	0.38	0.31	0.08	2.21
08.0	0.00	0.08	0.04	0.08	0.00	0.04	0.00	0.25
12.0	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04
SOUTHEAST				TOM JENKINS DAM				
00.5	0.08	1.15	2.85	3.54	3.23	2.54	0.38	14.45
01.0	0.08	1.15	2.85	3.54	3.23	2.54	0.38	14.45
02.0	0.08	0.46	1.38	1.85	1.23	0.92	0.08	6.36
04.0	0.00	0.00	0.31	0.46	0.62	0.54	0.54	0.08	2.64
08.0	0.00	0.00	0.00	0.00	0.15	0.08	0.00	0.00	0.18
12.0	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
SOUTHEAST				ZANESVILLE				
00.5	0.00	1.00	2.33	3.14	2.33	2.19	0.10	11.42
01.0	0.00	0.76	1.95	2.62	1.71	1.86	0.10	9.42
02.0	0.00	0.52	1.33	1.38	0.81	0.76	0.05	5.11
04.0	0.00	0.19	0.48	0.19	0.43	0.29	0.00	1.68
08.0	0.00	0.05	0.00	0.00	0.10	0.14	0.00	0.32
12.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

a definite peak in days with snowfall, the months of November and March have about the same number of days with snows of selected amounts and December and February are similar. Because of the low occurrence of days with snowfall of 8 inches or more, little can be said concerning the distribution of days with these rare storms.

Days with snow showers which result in an accumulation of 1 inch or more of snow in northeast Ohio are highly dependent on the mean air-water temperature difference (8). In general, the larger the difference between the mean air-water temperatures near the Lake Erie shoreline, the higher the frequency of occurrence of days with snow showers which give snowfalls of 1 inch or more.

THRESHOLD DATES

Each fall many people like to guess the date when the first snow will fall. For people directly involved with snow removal or for manufacturers or others who may derive a livelihood from snow-related activities, more reliable information is needed. For example, officials responsible for snow removal know that chemicals may effectively remove *light* snows but for *heavier* snows additional equipment will be needed. State highway officials may decide that all trucks must have their chemical spreaders installed before the 0.1 probability dates of the first 1-inch snowfall and that these same trucks should have snowplows ready for action by the 0.1 threshold probability dates associated with a 3-inch snowfall. Thus probability information related to snow threshold dates in fall gives information which could be used for such planning purposes.

Thom (11) has suggested the normal distribution without modification for use in computing snowfall threshold dates for a data series which is complete, i. e., threshold dates occur in all years. In cases where threshold dates do not occur in all years, Thom used the equation:

$$t_g = \sigma N^{-1} [G(x)/p] + \bar{t} \qquad [1]$$

where t_g = desired threshold date

σ = standard deviation

N^{-1} = normal deviate corresponding to probability $[G(x)/p]$

$G(x)$ = desired threshold probability

p = probability of a threshold occurrence

$\bar{t}$ = mean threshold date

to find desired threshold dates with probability G(x). Desired threshold dates can not be determined when the computed quantile probability, $[G(x)/p]$, exceeds p.

Tables 3, 4, and 5 give 1-, 3-, and 4-inch 24-hour[2] snowfall threshold statistics for selected locations in Ohio. Table 6 gives statistics related to the last 1-inch snow (in 24 hours) of the season. All available data from the 1940-1969 winter seasons were used in determining threshold dates given in these tables. For this period of record, 1-inch snowfall thresholds occurred in every winter season. Therefore, data in Tables 3 and 6 were developed by using the unmodified Gaussian distribution.

The procedure for finding the desired threshold probability dates in Tables 4 and 5 may be best exemplified by using data for the first station in Table 4. For this location, Defiance, $\bar{t} = 82.4$, $\sigma = 26.6$, and $p = .78$ (22 of 28 winter seasons had at least one 3-inch snowfall). In this study, days were numbered consecutively from Sept. 30. For the .10 quantile, equation [1] becomes $t_{.10} = 26.6\ N^{-1}\ [.10/.78] + 82.4$.

In this case $(G(x)/p) = .128$ and by referring to a table of the normal curve (15), $N^{-1}(.128)$ is found to be –1.13. Therefore, $t_{.10} = 26.6\ (-1.13) + 82.4 = 52$.

After converting day No. 52 (from Sept. 30) to date, $t_{.10}$ = Nov. 21. Thus, at Defiance, the first 3-inch snowfall within a 42-hour period has a 90 percent chance of falling after Nov. 21.

On the average, the first daily snowfall totaling 1 inch or more falls along and just southeast of the heart of Ohio's snowbelt in the northeast on about Nov. 10 but it isn't until Dec. 15 that extreme southeast areas record their first 1 inch of snow (Fig. 3.). Higher terrain at about 39° 15'N on both sides of the Scioto River Valley receive their first 1 inch or more of snow 5 to 8 days before those locations at approximately the same latitude but at lower elevation.

The variation between average dates of first 1-inch snows along the Lake Erie shoreline is much greater. Just as the tempering effects of the lake delay occurrences of freezing temperatures in fall (7), they also tend to delay the first snows along the shoreline westward from Vermilion to Toledo. Variations in occurrences of first seasonal snowfalls $\geq$ 1 inch are least in the northeast where the average standard deviation is 13.4 days. There is little difference in variations in occurrences of first *significant* snows of

[2] Data used in this study were for the observational day. Precipitation data for most locations were not in sufficient detail to allow the computation of snowfalls for any 24-hour period.

the winter season among the nine remaining climatic divisions. Average standard deviations for these nine areas range from 18.8 days in the southeast to 22.7 days for central Ohio.

Comparisons among the range in dates for the first snowfall $\geq$ 3 inches at the 0.5 probability level as given in Table 4 reveal that it takes nearly 2 months (Nov. 20 to Jan. 20) before all areas receive their first snowfall $\geq$ 3 inches; i. e., for years which actually have snowfalls of this magnitude. Similar comparisons for the first snowfall $\geq$ 4 inches indicate that it takes even longer (about Nov. 27 to Feb. 8) for all areas to receive their first snow $\geq$ 4 inches. Variations in occurrences of first snows of the season $\geq$ 3 and $\geq$ 4 inches are smallest in the northeast (average σ of 21.5 and 23.7 days, respectively). These variations in the nine other climatic divisions are much greater than those in northeast Ohio.

Within any climatic division, the variation in occurrences of first seasonal snowfalls of selected amounts increases as the snowfall in question increases. For example, at Geneva the

TABLE 3. — One-inch Snowfall Threshold Statistics for Selected Locations in Ohio. Entries Under t_g Indicate Month/Day.

	n	σ	P	t.05	t.10	t.25	t.50	t.90
Northwest								
Bowling Green	30	19.0	1.0	11/8	11/15	11/27	12/10	1/3
Findlay	30	20.1	1.0	11/2	11/9	11/21	12/5	12/30
Hoytville	16	22.5	1.0	11/2	11/10	11/24	12/9	1/6
Lima	30	19.6	1.0	11/3	11/10	11/23	12/5	12/30
Montpelier	30	24.2	1.0	10/24	11/11	11/26	12/2	1/2
Napoleon	30	21.3	1.0	10/31	11/8	11/21	12/5	1/1
Paulding	30	20.1	1.0	11/3	11/10	11/22	12/6	1/1
Toledo	13	19.0	1.0	11/1	11/7	11/19	12/2	12/26
Van Wert	30	24.1	1.0	10/24	11/3	11/17	12/3	1/2
Wauseon	27	22.2	1.0	10/29	11/6	11/19	12/4	1/2
North Central								
Bucyrus	30	15.0	1.0	10/24	11/9	11/18	11/28	12/17
Elyria	17	13.3	1.0	10/31	11/5	11/13	11/22	12/9
Fremont	16	24.8	1.0	11/2	11/11	11/26	12/13	1/13
Oberlin	30	13.6	1.0	11/13	11/18	11/26	12/5	12/23
Plymouth	30	16.8	1.0	11/7	11/13	11/24	12/5	12/26
Put In Bay	24	22.3	1.0	11/12	11/20	12/4	12/19	1/16
Norwalk	30	23.6	1.0	10/28	11/6	11/20	12/6	1/6
Sandusky	30	23.3	1.0	11/3	11/11	11/26	12/11	1/10
Tiffin	30	24.6	1.0	10/24	11/2	11/26	12/3	1/3
Upper Sandusky	30	16.5	1.0	11/2	11/8	11/18	11/29	12/20
Northeast								
Akron	20	19.5	1.0	10/18	10/25	11/6	11/19	12/14
Chardon	24	11.4	1.0	10/23	10/28	11/4	11/11	11/26
Chippewa Lake	15	12.6	1.0	10/29	11/3	11/11	11/19	12/5
Cleveland	24	13.9	1.0	10/29	11/3	11/11	11/21	12/8
Dorset	12	11.0	1.0	10/23	10/27	11/2	11/10	11/24
Geneva	26	11.9	1.0	10/28	11/2	11/9	11/17	12/2
Hiram	30	10.0	1.0	11/6	11/10	11/16	11/23	12/6
Painesville	16	14.7	1.0	10/22	10/28	11/5	11/15	12/4
Ravenna	18	12.6	1.0	10/28	11/2	11/9	11/18	12/4
Warren	30	15.8	1.0	10/27	11/2	11/11	11/22	12/12
Youngstown	19	14.0	1.0	10/22	10/27	11/5	11/14	12/2
West Central								
Bellefontaine	33	19.3	1.0	10/30	11/7	11/18	12/1	12/26
Greenville	30	21.1	1.0	11/1	11/9	11/22	12/6	1/2
Kenton	30	15.6	1.0	11/4	11/10	11/19	11/30	12/20
Sidney	24	23.1	1.0	10/29	11/7	11/21	12/6	1/5
Urbana	30	16.7	1.0	11/5	11/11	11/21	12/2	12/23
Central								
Circleville	14	14.7	1.0	11/16	11/22	11/30	12/10	12/29
Columbus	30	26.5	1.0	10/28	11/7	11/23	12/11	1/14
Delaware	30	22.2	1.0	11/1	11/10	11/23	12/8	1/6
Irwin	27	24.1	1.0	10/27	11/5	11/19	12/6	1/6
Lancaster	30	27.1	1.0	10/27	11/6	11/23	12/11	1/15
London	25	24.1	1.0	10/27	11/5	11/20	12/6	1/6
Central (Cont.)								
Marysville	30	21.4	1.0	11/3	11/11	11/23	12/8	1/4
Newark	30	24.3	1.0	10/28	11/6	11/21	12/7	1/7
Washington C.H.	30	20.1	1.0	11/4	11/11	11/23	12/7	1/1
Central Hills								
Ashland	30	18.6	1.0	10/26	11/2	11/13	11/26	12/20
Charles Mill Dam	30	19.5	1.0	10/30	11/6	11/18	12/1	12/26
Coshocton	30	22.0	1.0	11/4	11/12	11/25	12/10	1/7
Fredericktown	27	20.1	1.0	10/30	11/6	11/19	12/2	12/28
Mansfield	30	18.8	1.0	10/28	11/3	11/24	11/27	12/21
Millersburg	30	22.2	1.0	11/2	11/11	11/24	12/9	1/6
Wooster	30	22.8	1.0	10/23	10/31	11/14	11/29	12/28
Northeast Hills								
Cadiz	18	16.8	1.0	11/10	11/16	11/27	12/8	12/29
Canfield	23	16.8	1.0	11/5	11/11	11/22	12/3	12/24
Dennison	30	21.1	1.0	10/29	11/6	11/19	12/3	12/30
Millport	30	21.2	1.0	10/27	11/4	11/16	12/1	12/28
Steubenville	28	20.5	1.0	10/28	11/4	11/16	11/30	12/27
Southwest								
Chilo	30	22.1	1.0	11/12	11/20	12/4	12/19	1/16
Cincinnati	30	30.2	1.0	10/25	11/5	11/24	12/14	1/22
Dayton	24	20.9	1.0	11/1	11/8	11/21	12/5	1/1
Eaton	24	19.4	1.0	11/1	11/8	11/20	12/3	12/28
Franklin	23	20.7	1.0	11/4	11/12	11/25	12/9	1/4
Hillsboro	30	20.0	1.0	10/29	11/6	11/18	12/1	12/27
Wilmington	30	21.5	1.0	10/26	11/3	11/16	11/30	12/28
Xenia	30	23.0	1.0	11/2	11/11	11/25	12/10	1/9
South Central								
Carpenter	13	18.4	1.0	11/12	11/18	11/30	12/12	1/5
Chillicothe	30	23.9	1.0	11/4	11/13	11/27	12/13	1/13
Jackson	25	15.7	1.0	11/10	11/16	11/25	12/6	12/26
Gallipolis	30	23.2	1.0	11/4	11/10	11/26	12/12	1/10
Ironton	30	22.2	1.0	11/6	11/14	11/28	12/13	1/9
Peebles	30	23.7	1.0	11/4	11/13	11/27	12/13	1/13
Portsmouth	30	20.0	1.0	11/8	11/16	11/28	12/11	1/6
Waverly	30	23.1	1.0	11/3	11/12	11/26	12/11	1/10
Southeast								
Athens	15	21.4	1.0	10/29	11/6	11/19	12/3	12/31
Barnesville	20	15.7	1.0	11/11	11/17	11/26	12/7	12/27
Cambridge	28	17.3	1.0	11/8	11/14	11/24	12/6	12/28
Marietta	21	25.4	1.0	10/31	11/10	11/25	12/12	1/14
McConnelsville	28	17.3	1.0	11/10	11/16	11/27	12/8	12/30
New Lexington	27	18.6	1.0	11/2	11/9	11/20	12/2	12/26
Philo	30	18.8	1.0	11/5	11/12	11/23	12/6	12/30
Senecaville	30	21.4	1.0	10/31	11/8	11/20	12/5	1/1
Summerfield	19	13.6	1.0	11/16	11/21	11/29	12/8	12/26

standard deviations associated with first 1-, 3-, and 4-inch snowfalls as given in Tables 3, 4, and 5 are 11.9, 14.8, and 21.6 days, respectively. There are at least three reasons for this increase in variability. They are: 1) the larger the threshold snowfall, the smaller the sample population; i. e., not all locations have snows of 3 and/or 4 inches every winter; 2) the larger the snowfall, the harder it is for the observer to obtain a representative *average estimate* of total snowfall (this is especially true when drifting occurs); and 3) melting and settling are obvious problems which are difficult to overcome.

Figure 4 shows the 0.5 probability level dates of the last 24 hour snowfall of the winter season $\geq$ 1 inch. At this probability level, it takes approximately the same average number of days for the last 1-inch snow to occur throughout Ohio as it does for all locations to receive their first 1-inch snow.

There is great contrast in the distribution of dates associated with these events. For the 0.5 probability level, it takes about 31 days for all locations in northern Ohio to receive their first snowfall $\geq$ 1 inch while the last 1-inch snow of the season occurs in a period of around 16 days. In the southern half of Ohio, the average dates of the first snowfall $\geq$ 1 inch occur within an 11-day period (Dec. 5 to 15) but on the average it takes 24 days (Feb. 25 to March 20) for these areas to record their last snow $\geq$ 1 inch.

In 8 of 10 climatic divisions (south central and southeast are the exceptions), the variation

TABLE 4. — Three-inch Snowfall Threshold Statistics for Selected Locations in Ohio. Entries Under t_g Indicate Month/Day.

	n	σ	P	$t_{.05}$	$t_{.10}$	$t_{.25}$	$t_{.50}$	$t_{.90}$
Northwest								
Defiance	28	26.6	.78	11/10	11/21	12/8	12/30	
Findlay	30	23.2	.86	11/30	12/9	12/24	1/11	
Lima	30	34.4	.93	11/5	11/18	1/27	1/3	3/1
Napoleon	30	26.1	.93	11/6	11/16	12/1	12/21	2/3
Paulding	30	28.4	.90	11/11	11/22	12/1	12/31	
Toledo	13	23.3	.92	11/8	11/17	11/23	12/18	1/26
Van Wert	30	32.2	1.00	11/3	11/14	12/4	12/26	2/5
Wauseon	27	38.6	.88	10/31	11/14	11/25	1/5	
North Central								
Bucyrus	30	36.3	.93	11/3	11/16	11/27	1/4	3/5
Elyria	17	26.9	1.00	11/8	11/17	12/4	12/22	1/25
Fremont	16	34.3	.75	11/11	11/25	12/18	1/17	
Norwalk	30	41.2	.96	11/5	11/20	12/15	1/12	3/11
Sandusky	30	34.8	.90	11/10	11/23	12/4	1/10	
Tiffin	30	38.2	.93	11/2	11/16	11/26	1/5	3/10
Northeast								
Akron	20	28.5	.90	10/26	11/6	11/14	12/15	
Chardon	24	15.0	1.00	10/28	11/2	11/11	11/21	12/11
Chippewa Lake	15	27.6	1.00	11/5	11/15	12/2	12/21	1/25
Geneva	26	14.8	1.00	10/31	11/5	11/14	11/24	12/13
West Central								
Bellefontaine	33	38.7	.81	11/3	11/18	12/13	1/13	
Greenville	30	33.3	.90	11/10	11/23	12/3	1/7	
Sidney	24	31.6	.87	11/5	11/16	12/7	12/31	2/20
Urbana	30	35.4	.83	11/8	11/22	12/15	1/12	
Central								
Circleville	14	24.6	1.00	11/22	12/1	12/16	1/2	2/2
Columbus	30	36.6	.76	11/6	11/20	12/15	1/15	
Delaware	30	32.5	.96	11/6	11/18	12/8	12/30	2/14
Lancaster	30	26.9	.76	11/5	11/16	12/4	12/26	
London	25	29.5	.84	11/8	11/20	12/9	1/2	
Marion	29	33.8	.93	11/8	11/20	11/30	1/5	3/2
Marysville	30	32.0	.96	11/4	11/17	12/3	12/25	2/8
Newark	30	22.7	.93	11/13	11/22	11/28	12/22	1/30
Washington C.H.	30	22.5	.90	11/13	11/22	11/28	12/22	
Central Hills								
Ashland	30	34.1	.93	10/28	11/9	11/19	12/25	2/21
Central Hills (Cont.)								
Centerburg	22	27.9	1.00	11/4	11/14	12/1	12/20	1/24
Charles Mill Dam	30	38.2	.93	11/1	11/15	11/26	1/5	3/10
Coshocton	30	29.9	.93	11/12	11/23	12/1	1/2	2/22
Fredericktown	27	32.7	1.00	11/8	11/20	12/10	1/1	2/12
Mansfield	30	29.3	.90	11/7	11/17	11/27	12/27	
Wooster	30	32.8	.90	11/4	11/16	11/26	12/31	
Northeast Hills								
Cadiz	17	21.5	1.00	11/16	11/24	12/7	12/21	1/18
Canfield	23	30.2	.91	11/7	11/18	11/28	12/30	
Dennison	30	25.9	.90	11/8	11/18	11/25	12/23	
Millport	30	38.4	.86	10/29	11/12	12/7	1/4	
Steubenville	28	34.2	1.00	10/30	11/12	12/2	12/25	2/7
Southwest								
Chilo	30	37.7	.76	11/12	11/27	12/22	1/24	
Cincinnati	30	31.7	.83	11/16	11/28	12/19	1/13	
Dayton	24	38.6	.83	11/3	11/18	12/13	1/13	
Eaton	24	29.5	.95	11/8	11/19	12/7	12/27	2/8
Franklin	23	34.5	.78	11/8	11/21	12/14	1/13	
Hillsboro	30	32.1	.96	10/30	11/11	12/1	12/23	2/7
Wilmington	30	27.7	.93	11/4	11/14	11/22	12/21	2/6
Xenia	30	33.2	.83	11/5	11/18	12/10	1/5	
South Central								
Chillicothe	30	37.1	.86	11/12	11/26	12/20	1/17	
Jackson	25	27.8	.88	11/19	11/29	12/17	1/7	2/21
Gallipolis	30	34.4	.80	11/16	11/29	12/21	1/18	
Ironton	30	31.7	.70	11/19	12/1	12/23	1/21	
Peebles	30	29.2	.83	11/7	11/19	12/8	12/31	
Portsmouth	30	26.0	.70	11/21	12/1	12/19	1/13	
Southeast								
Athens	15	38.0	.93	11/3	11/17	11/28	1/7	3/11
Barnesville	20	26.1	.90	11/14	11/24	12/2	12/29	
Cambridge	28	21.1	.96	11/17	11/25	12/8	12/22	2/2
Clarington Lock	28	29.7	.92	11/16	11/27	12/5	1/5	2/25
Marietta	21	28.9	.66	11/18	11/29	12/20	1/18	
New Lexington	27	27.7	.85	11/10	11/20	12/8	12/29	2/12
Philo	30	31.9	.80	11/6	11/19	12/10	1/4	
Senecaville	30	23.1	.93	11/14	11/23	11/29	12/24	2/1
Tom Jenkins Dam	15	25.2	1.00	11/8	11/27	12/2	12/19	1/21

in dates at the 0.5 probability level associated with the last snowfall $\geq$ 1 inch is much less than the 0.5 probability level variation in dates associated with the first 1 inch or greater snowfall. In the northwest, for example, the average σ associated with the 1-inch threshold dates at the 0.5 probability level is 21.2 days but for the last snowfall $\geq$ 1 inch, this average σ is 15.5 days.

DURATION OF SNOW COVER

Information related to duration of snow cover throughout Ohio is of increasing importance. In recent years a winter pasture program has met with widespread interest because of the substantial savings in equipment and labor costs over conventional wintering of beef cattle (13). For this program, the first hay crop in spring is harvested as round bales and left in the field so that the bales of hay together with accumulated growth during the remainder of the growing season provide winter feed for cattle. It thus becomes important to have information on snow cover so that sufficient emergency feed can be made available to the cattle throughout the winter.

On days with snow cover, temperatures are not as high as they might be without snow cover. A snow cover also allows additional cooling at night. Thus, a persistent snow cover definitely tends to lower daily average temperatures. In general, however, the protection afforded by snow cover to vegetation more than offsets the adverse effects of the colder temperatures.

Unfortunately, snow cover data are not included in Ohio's library of machine-processable weather information (14). Since Nov. 1949, however, the National Weather Records Center (NWRC) has made daily information on snow cover available in published form (12). Snow cover data from these publications for the winter seasons of Oct. 1959 to April 1969 are summarized in Table 7.

The duration of snow cover is longest and most continuous in the snowbelt counties of northeast Ohio where the amount of snowfall is also greatest. However, nearly every winter even the snowbelt area has periods without snow

TABLE 5. — Four-inch Snowfall Threshold Statistics for Selected Locations in Ohio. Entries Under t_g Indicate Month/Day.

	n	σ	P	$t_{.05}$	$t_{.10}$	$t_{.25}$	$t_{.50}$	$t_{.90}$
Northwest								
Lima	30	43.4	.83	11/1	11/17	12/16	1/19	
Toledo	13	38.5	.76	11/9	11/24	12/20	1/20	
Van Wert	30	40.8	.90	11/3	11/19	12/1	1/13	
North Central								
Bucyrus	30	34.8	.93	11/20	12/4	12/13	1/19	3/17
Elyria	17	37.1	.76	11/2	11/17	12/12	1/11	
Norwalk	30	40.9	.83	11/8	11/24	12/20	1/21	
Sandusky	30	40.1	.66	11/11	11/27	12/26	2/3	
Northeast								
Akron	20	22.4	.80	11/20	11/29	12/14	1/1	
Chardon	24	17.5	1.00	10/29	11/4	11/17	11/27	12/19
Chippewa Lake	15	33.4	1.00	11/11	11/23	12/17	1/5	2/17
Geneva	26	21.6	.96	10/23	10/31	11/13	11/28	12/29
West Central								
Bellefontaine	33	41.2	.63	11/8	11/24	12/25	2/6	
Greenville	30	42.3	.66	11/12	11/30	12/31	2/10	
Urbana	30	41.0	.73	11/12	11/28	12/26	1/30	
Central								
Columbus	30	40.4	.63	11/6	11/21	12/21	2/2	
Delaware	30	34.8	.86	11/21	12/4	12/27	1/22	
Lancaster	30	36.2	.56	11/3	11/20	12/18	2/4	
Marion	29	42.8	.82	11/9	11/26	12/24	1/27	
Marysville	30	33.8	.76	11/9	11/22	12/15	1/13	
Newark	29	28.3	.75	11/20	12/1	12/20	1/13	
Central Hills								
Ashland	30	38.9	.83	11/8	11/22	12/18	1/17	
Centerburg	22	34.1	.90	11/13	11/26	12/7	1/12	

	n	σ	P	$t_{.05}$	$t_{.10}$	$t_{.25}$	$t_{.50}$	$t_{.90}$
Central Hills (Cont.)								
Charles Mill Dam	30	37.4	.76	11/16	11/30	12/25	1/26	
Coshocton	30	31.7	.76	11/16	11/28	12/20	1/16	
Mansfield	30	30.6	.60	11/15	11/28	12/21	1/26	
Wooster	30	39.0	.70	11/3	11/18	12/17	1/25	
Northeast Hills								
Cadiz	17	23.3	.82	11/17	11/26	12/11	12/30	
Dennison	30	34.3	.73	11/9	11/22	12/16	1/15	
Millport	30	39.9	.73	11/3	11/18	12/16	1/20	
Steubenville	28	37.6	.78	11/7	11/22	12/17	1/17	
Southwest								
Chilo	30	32.6	.50	12/5	12/19	1/15		
Cincinnati	30	36.2	.66	11/16	11/30	12/26	1/31	
Dayton	24	42.2	.75	11/9	11/26	1/4	1/30	
Eaton	24	40.5	.75	11/10	12/6	12/23	1/27	
Franklin	23	36.6	.69	11/11	11/25	12/21	1/24	
Hillsboro	30	33.3	.80	11/11	11/24	12/16	1/12	
Xenia	30	39.4	.73	11/15	11/30	12/27	1/31	
South Central								
Carpenter	13	33.9	.76	11/17	11/29	12/23	1/29	
Chillicothe	30	36.3	.63	11/20	12/4	12/31	2/8	
Gallipolis	30	29.1	.56	11/24	12/7	12/29	2/6	
Ironton	30	32.9	.56	11/25	12/9	1/3	2/16	
Peebles	30	31.7	.70	11/17	11/29	12/22	1/20	
Southeast								
Athens	15	37.5	.73	11/15	11/30	12/26	1/28	
Cambridge	28	29.4	.78	11/15	11/26	12/16	1/9	
Marietta	20	31.6	.65	11/17	11/29	12/23	1/23	
New Lexington	27	25.3	.70	11/19	11/29	12/16	1/9	
Philo	30	26.7	.63	11/21	12/2	12/21	1/19	

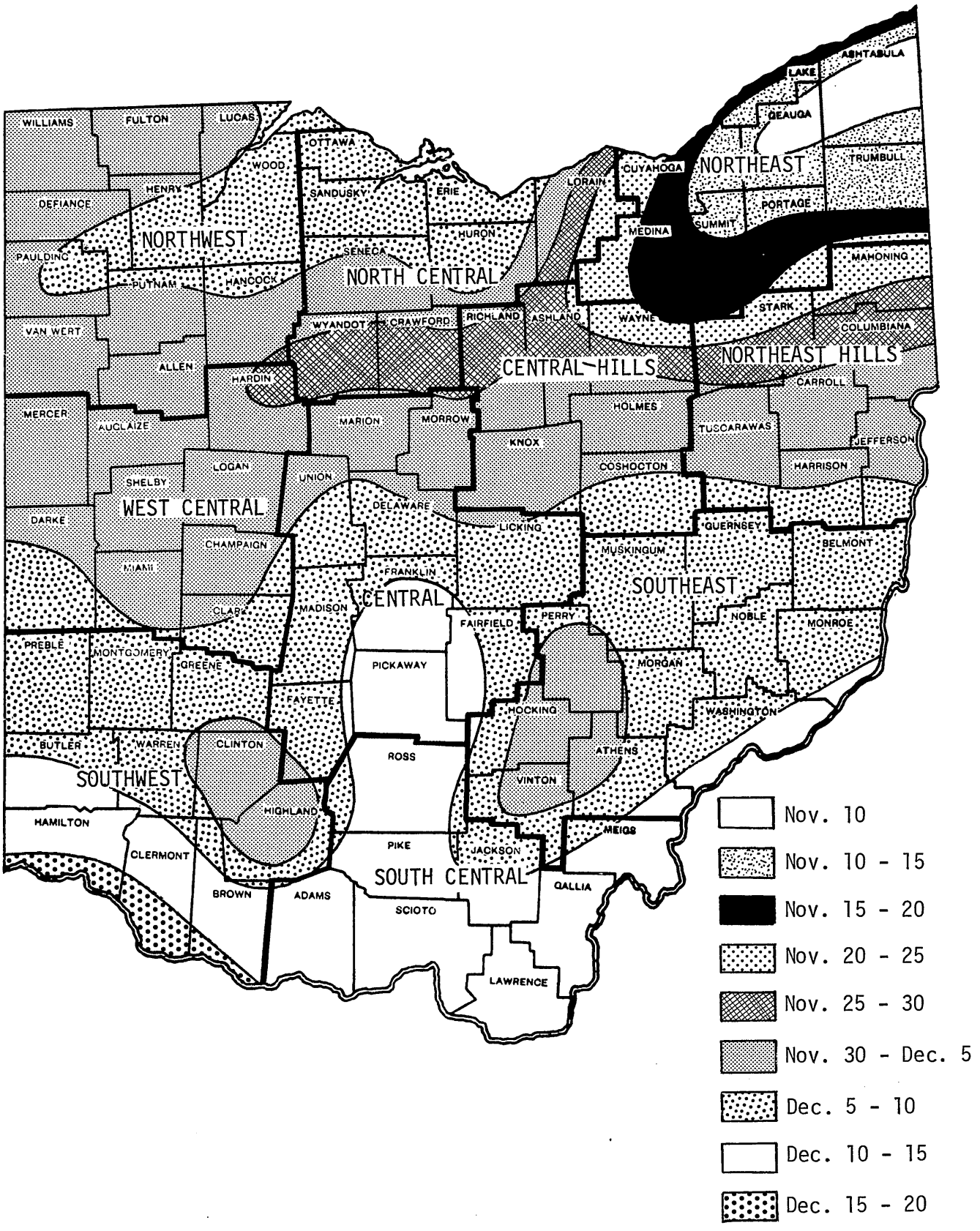

Fig. 3.—Mean 1-inch snowfall threshold dates.

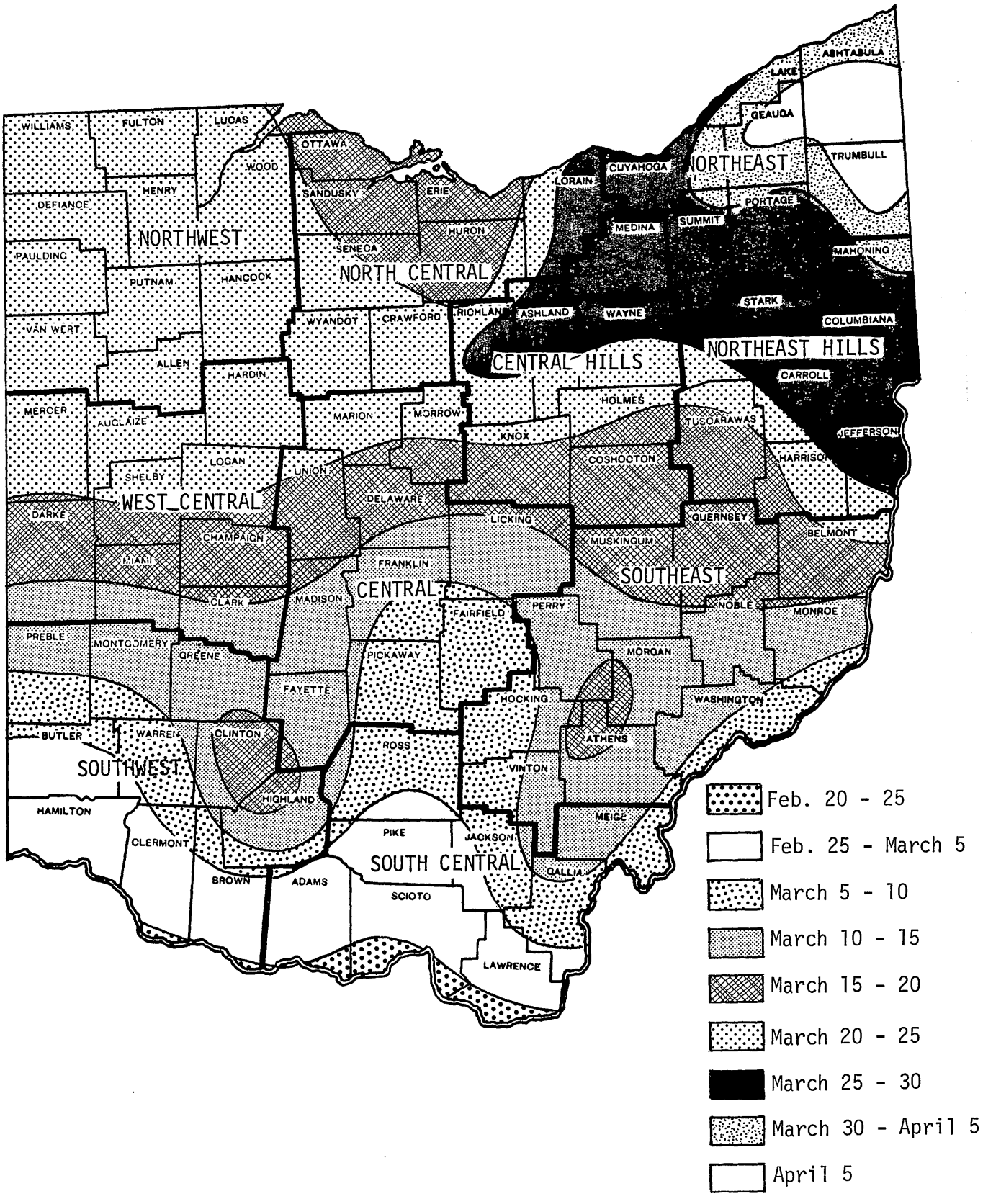

Fig. 4.—Mean dates of last snowfall of winter season equal to or greater than 1 inch.

on the ground. During the winters of 1960-1969, Chardon had 21 periods with snow cover ≥ 1 inch lasting at least 10 consecutive days, 14 periods with snow cover ≥ 1 inch lasting at least 15 days, 10 periods which lasted at least 20 days, and 7 periods with snow cover lasting more than 30 consecutive days.

Such high frequencies of extended periods with snow cover are common only in the snowbelt area. For example, during this same 10-year period Columbus recorded 10 occurrences of snow cover ≥ 1 inch lasting at least 10 days, 5 periods which lasted 15 or more consecutive days, 3 periods of snow cover lasting 20 or more days, and only once in this decade did the ground remain covered for more than 30 consecutive days. Cincinnati's frequencies of snow cover ≥ 1 inch for 10, 15, 20, and 30 consecutive day periods in 1960-1969 were 6, 4, 2, and 0, respectively. Between Dec. 6, 1962, and March 16, 1963 (101 days), the ground at Chardon was covered with snow ≥ 1 inch in

TABLE 6. — Statistics of Last One-inch Snowfall of Season for Selected Ohio Locations. Entries Under t_g Indicate Month/Day.

	n	σ	$t_{.10}$	$t_{.50}$	$t_{.75}$	$t_{.90}$	$t_{.95}$
Northwest							
Defiance	28	16.7	3/1	3/23	3/3	4/13	4/19
Findlay	30	15.8	2/25	3/16	3/27	4/6	4/11
Hoytville	16	13.3	3/3	3/21	3/30	4/7	4/11
Lima	30	17.7	2.26	3.20	4/1	4/11	4/18
Montpelier	30	18.9	2/21	3/17	3/29	4/10	4/17
Napoleon	30	14.1	2/29	3/19	3/28	4/6	4/11
Toledo	13	14.1	3/7	3/25	3/3	4/12	4/17
Van Wert	29	14.9	3/4	3/23	4/2	4/11	4/17
Wauseon	27	14.2	3/4	3/22	4/1	4/9	4/14
North Central							
Bucyrus	30	16.9	3/3	3/25	4/4	4/14	4/21
Elyria	16	12.9	3/12	3/28	4/4	4/13	4/17
Fremont	16	18.6	2/21	3/16	3/28	4/9	4/15
Oberlin	30	17.1	3/2	3/24	4/5	4/15	4/21
Plymouth	30	17.1	2/26	3/19	3/31	4/10	4/16
Norwalk	30	16.4	2/26	3/18	3/29	4/8	4/14
Sandusky	30	15.2	2/29	3/20	3/30	4/8	4/14
Tiffin	30	16.1	2/29	3/21	3/31	4/10	4/16
Upper Sandusky	30	14.7	3/3	3/22	4/1	4/10	4/15
Northeast							
Akron	20	12.5	3/16	4/1	4/9	4/17	4/21
Chardon	24	9.1	3/25	4/6	4/12	4/17	4/21
Chippewa Lake	16	11.1	3/14	3/28	4/4	4/11	4/15
Cleveland	24	12.2	3/13	3/28	4/5	4/13	4/17
Dorset	12	12.5	3/21	4/6	4/14	4/21	4/26
Geneva	26	14.0	3/17	4/4	4/13	4/21	4/25
Hiram	30	15.4	3/6	3/26	4/5	4/14	4/20
Painesville	16	8.7	3.17	3/28	3/3	4/8	4/11
Ravenna	18	12.0	3/14	3/29	4/6	4/13	4/18
Warren	30	18.8	3/6	3/30	4/11	4/22	4/29
Youngstown	19	17.1	3/14	4/5	4/16	4/26	5/3
West Central							
Bellefontaine	31	16.5	2/25	3/18	3/29	4/8	4/14
Celina	13	12.9	3/5	3/22	3/31	4/7	4/12
Greenville	30	20.2	2/17	3/14	3/28	4/9	4/17
Kenton	30	18.1	2/29	3/23	4/4	4/15	4/22
Sidney	23	14.7	3/1	3/20	3/30	4/8	4/13
Springfield	26	18.2	2/28	3/23	4/4	4/15	4/22
Urbana	30	19.2	2/21	3/17	3/30	4/10	4/17
Central							
Columbus	30	23.1	2/10	3/10	3/26	4/9	4/17
Delaware	30	15.7	2/25	3/16	3/26	4/5	4/11
Irwin	27	13.9	3/3	3/21	3/31	4/8	4/13
London	25	18.3	2/20	3/15	3/27	4/7	4/14
Marysville	30	18.7	2/20	3/15	3/27	4/6	4/14
Newark	29	15.2	2/22	3/13	3/23	4/1	4/7
Central (Cont.)							
Washington C. H.	30	17.2	2/21	3/14	3/25	4/5	4/11
Central Hills							
Ashland	30	16.1	3/6	3/26	4/6	4/16	4/22
Centerburg	22	15.1	3/3	3/22	4/2	4/11	4/16
Charles Mill Dam	30	18.4	3/2	3/25	4/7	4/18	4/24
Fredericktown	27	18.5	2/25	3/20	4/1	4/12	4/19
Mansfield	30	14.9	3/6	3/25	4/4	4/13	4/19
Millersburg	30	16.4	2/27	3/19	3/30	4/9	4/15
Wooster	30	23.3	2/21	3/22	4/6	4/20	4/29
Northeast Hills							
Cadiz	17	17.3	3/2	3/24	4/4	4/15	4/21
Canfield	23	19.0	2/29	3/25	4/6	4/18	4/25
Dennison	30	16.4	3/4	3/15	3/26	4/5	4/11
Millport	30	17.3	3/11	3/23	3/3	4/14	4/20
Steubenville	28	16.4	3/7	3/28	4/8	4/18	4/24
Southwest							
Chilo	30	26.8	1/21	2/25	3/14	3/30	4/9
Cincinnati	30	21.0	2/5	3/3	3/17	3/30	4/7
Dayton	24	28.2	2/6	3/14	4/2	4/18	4/28
Eaton	24	18.9	2/15	3/10	3/23	4/4	4/10
Franklin	23	20.8	2/7	3/4	3/18	3/31	4/7
Hamilton	30	16.3	2/11	3/3	3/14	3/24	3/30
Hillsboro	30	19.8	2/15	3/12	3/25	4/6	4/13
Wilmington	30	18.4	2/29	3/23	4/4	4/16	4/23
Xenia	30	20.7	2/12	3/9	3/23	4/5	4/12
South Central							
Carpenter	12	20.3	2/12	3/9	3/23	4/4	4/12
Chillicothe	30	21.8	2/7	3/6	3/21	3/3	4/11
Jackson	25	18.1	2/18	3/12	3/24	4/4	4/11
Gallipolis	30	23.3	2/11	3/12	3/28	4/11	4/19
Ironton	30	24.7	1/23	2/24	3/11	3/26	4/4
Peebles	30	24.6	1/29	2/29	3/17	4/1	4/10
Portsmouth	30	20.1	2/2	2/28	3/13	3/25	4/1
Waverly	30	20.6	2/5	3/3	3/16	3/29	4/5
Southeast							
Athens	15	16.3	2/16	3/8	3/19	3/29	4/4
Barnesville	20	15.4	3/1	3/21	3/31	4/10	4/15
Cambridge	29	16.6	2/24	3/16	3/27	4/6	4/12
Marietta	21	25.6	1/29	3/2	3/20	4/4	4/13
McConnelsville	28	22.8	2/14	3/14	3/29	4/12	4/20
New Lexington	27	23.9	2/9	3/11	3/27	4/10	4/19
Philo	30	20.5	2/17	3/15	3/29	4/10	4/18
Senecaville	30	21.4	2/19	3/17	4/1	4/13	4/21
Summerfield	17	18.1	2/20	3/14	3/26	4/6	4/13
Tom Jenkins Dam	15	14.0	3/5	3/23	4/1	4/10	4/15

p = 1.00 for all locations

depth. The longest consecutive periods with snow cover $\geq$ 1 inch (i. e., during winters of 1960-1969) at Columbus and Cincinnati were 31 and 25 days.

EXTREME SNOWFALLS, SNOW DEPTHS, AND SNOW LOADS

In addition to answering academic questions such as "How often can we expect to have a snowfall like today?", statistics related to extreme 24-hour snowfalls and extreme snow depths during winter are of direct concern to all people. The U. S. Post Office uses information related to the frequency of snowfalls $\geq$ 1 inch and the magnitude of the extreme snowfall of the season

TABLE 7. – Mean Number of Days with Snow Cover on the Ground $\geq$1 Inch for Selected Ohio Locations.*

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Season
Northwest								
Toledo	0	2	12	12	12	7	1	48
Van Wert	0	2	12	14	11	7	0	46
Wauseon	0	2	11	11	9	6	0	39
North Central								
Sandusky	0	1	9	12	11	8	0	41
Tiffin	0	1	9	13	11	8	0	42
Northeast								
Akron	0	1	13	16	15	8	1	54
Chardon	1	5	19	24	22	14	1	86
Cleveland	0	1	13	15	15	9	0	53
Youngstown	0	2	16	16	17	10	1	62
West Central								
Bellefontaine	0	2	10	10	6	4	0	32
Celina	0	1	11	10	9	6	0	36
Central								
Columbus	0	1	9	10	9	4	0	33
Marion	0	2	11	12	11	8	0	44
Central Hills								
Coshocton	0	1	7	10	11	5	0	34
Wooster	0	1	14	14	12	7	0	48
Northeast Hills								
New Philadelphia	0	1	11	17	14	4	0	47
Steubenville	0	1	12	12	14	5	0	44
Southwest								
Cincinnati	0	1	4	9	7	3	0	24
Dayton	0	1	8	9	7	5	0	30
Wilmington	0	2	10	12	10	6	0	40
South Central								
Carpenter	0	0	3	10	7	2	0	22
Ironton	0	1	4	8	5	2	0	20
Waverly	0	1	6	9	9	2	0	27
Southeast								
McConnelsville	0	1	9	13	11	4	0	38
Senecaville	0	1	12	14	13	6	0	46

*Means for period October 1959–April 1969.

in purchasing proper snow removal equipment for their offices. Designers of buildings and other structures must consider the load which accumulated snow will place on their roofs or structures.

Following the Lieblein method[3], (2) of fitting the Fisher-Tippett Type I distribution, extreme 24-hour snowfalls and extreme snow depths with mean recurrence intervals of 2, 5, 10, 25, 50, and 100 years were determined for 85 locations. These extreme snowfall and snow depth data for the selected return intervals are presented in Table 8.

All available extreme 24-hour snowfall and snow depth data from the winter seasons of 1940-1969 were used in calculating the data in Table 8. An illustration for determining the mean recurrence interval associated with some heavy 24-hour snowfall or the probability of snow accumulating to some depth can be made by referring to data for Akron. (A recurrence interval of 50 years means that over an extended period of time the event can be expected to occur on the average once in 50 years.) At Akron, the mean recurrence interval for a 24-hour snowfall of 10.5 inches is 25 years; i. e., on the average a storm of this magnitude will occur once in 25 years. For the same recurrence interval, Akron can expect snow to accumulate to a depth of at least 15 inches.

Some idea of the distribution of extreme 24-hour snowfalls within Ohio can be made by referring to Figure 5. This figure shows 24-hour extreme snowfalls for the winter season with a mean recurrence interval of 5 years. Except for northeast Ohio, the range in extreme 24-hour snowfalls with this return interval is generally between 6 and 8 inches.

Beginning with the winter of 1953, the Weather Bureau started to measure the water equivalent[4] of snow on the ground each day. The collection of such data has resulted in more meaningful estimates of the weight which an accumulated snow pack might induce on roofs of buildings. Prior to the collection of water equivalent data by major Weather Bureau facilities, it was necessary to use snow depth data similar to that given in Table 8 and then to apply an average density to obtain the weight of the snow. Later, however, it was shown that snow pack density and snow depth are not related (10).

[3] Lieblein's fitting procedure was followed in finding extreme snowfall and snow depth data but instead of using the Lieblein table of order statistics weights, those attributed to Mann (4) were used.

[4] Water equivalent data related to snow depths are collected for only eight locations in Ohio – the Weather Service offices at Akron, Cincinnati, Cleveland, Columbus, Dayton, Mansfield, Toledo, and Youngstown.

TABLE 8.—Statistics on Maximum 24-hour Snowfall and Maximum Snow on the Ground for Selected Ohio Locations.

		Snowfall (Inches) Mean Recurrence Interval in Years						Snow Depth (Inches) Mean Recurrence Interval in Years					
	n	2	5	10	25	50	100	2	5	10	25	50	100
Northwest													
Bowling Green	30	4.2	5.3	6.0	6.9	7.6	8.3	5	6	7	9	10	11
Findlay	30	4.8	6.5	7.7	9.1	10.2	11.3	6	8	9	11	13	14
Lima	30	5.4	7.6	9.2	11.1	12.5	13.9	6	9	11	13	15	17
Montpelier	30	5.5	7.6	9.0	10.8	12.1	13.5	6	9	11	13	14	16
Napoleon	30	5.5	7.2	8.3	9.7	10.7	11.7	7	9	11	13	15	16
Paulding	30	4.2	6.0	7.2	8.7	9.8	10.9	7	10	11	14	15	17
Toledo	13	4.8	6.3	7.3	8.5	9.5	10.4	6	8	9	10	11	12
Van Wert	30	5.2	6.8	7.9	9.2	10.2	11.2	5	7	9	11	12	13
Wauseon	28	4.8	6.6	7.8	9.4	10.5	11.7	6	8	10	12	13	14
North Central													
Bucyrus	30	5.9	8.1	9.6	11.5	12.9	14.3	7	10	13	15	17	19
Elyria	17	6.1	8.7	10.5	12.7	14.3	16.0	7	10	12	15	17	19
Norwalk	30	5.0	6.7	7.9	9.3	10.3	11.4	7	10	12	14	16	18
Oberlin	30	6.4	8.9	10.5	12.6	14.1	15.7	8	11	13	16	18	20
Plymouth	30	5.4	7.8	9.3	11.4	12.9	14.3	7	9	11	14	16	18
Put In Bay	24	4.7	6.7	8.0	9.7	10.9	12.1	6	8	10	12	14	15
Sandusky	30	4.8	6.9	8.3	10.0	11.3	12.6	6	9	10	13	14	16
Tiffin	30	5.1	7.0	8.2	9.8	10.9	12.1	6	9	10	12	14	15
Upper Sandusky	30	5.4	7.0	8.1	9.5	10.5	11.5	6	8	10	11	12	13
Northeast													
Akron	20	5.4	7.4	8.8	10.5	11.8	13.0	7	10	12	15	16	18
Chardon	24	10.0	13.2	15.2	17.8	19.7	21.7	15	20	24	29	32	36
Chippewa Lake	16	6.2	7.9	9.0	10.4	11.4	12.5	7	10	12	15	16	18
Cleveland	24	5.8	7.8	9.2	11.0	12.3	13.6	8	11	13	15	17	19
Dorset	11	6.7	7.8	8.6	9.6	10.3	11.0	11	14	17	19	22	24
Geneva	26	8.7	12.8	15.6	19.0	21.5	24.1	14	21	26	32	36	41
Hiram	30	6.5	8.7	10.1	11.9	13.3	14.6	9	13	16	19	21	24
Painesville	17	6.9	10.2	12.4	15.2	17.3	19.3	9	12	14	17	19	21
Ravenna	19	5.1	6.6	7.6	8.8	9.8	10.7	6	8	10	13	14	16
Warren	30	5.9	8.2	9.7	11.6	13.0	14.4	8	11	13	16	18	20
Youngstown	19	5.9	7.9	9.2	10.8	12.0	13.2	8	11	13	15	17	19
West Central													
Bellefontaine	30	4.2	5.7	6.7	8.0	8.9	9.8	5	7	8	10	11	13
Celina	13	5.1	6.7	7.9	9.3	10.3	11.3	7	10	12	15	17	18
Greenville	30	4.8	6.6	7.9	9.5	10.6	11.8	6	9	11	14	16	17
Kenton	30	4.9	6.6	7.7	9.2	10.2	11.3	7	9	11	13	15	16
Sidney	24	4.8	6.5	7.7	9.1	10.2	11.3	6	7	9	10	11	13
Springfield	26	5.3	7.5	8.9	10.8	12.1	13.5	6	9	11	14	15	17
Urbana	30	4.6	6.5	7.7	9.3	10.4	11.6	6	9	11	13	15	17
Central													
Circleville	14	4.9	6.4	7.4	8.6	9.5	10.5	6	8	9	11	12	14
Columbus	30	4.4	6.1	7.3	8.7	9.8	10.9	5	8	9	11	13	14
Delaware	30	5.0	6.8	8.0	9.6	10.8	11.9	6	9	11	13	15	17
Irwin	27	5.1	7.1	8.5	10.2	11.4	12.7	6	9	11	13	15	16
London	24	4.3	6.2	7.4	9.0	10.1	11.3	5	8	9	11	13	15
Marysville	30	5.6	8.0	9.7	11.8	13.3	14.8	6	9	11	13	15	17
Newark	30	5.4	8.0	9.8	11.9	13.6	15.2	6	10	12	15	17	19
Washington C. H.	30	4.9	6.9	8.2	9.8	11.0	12.3	6	9	12	14	16	18
Southeast													
Athens	15	5.4	8.4	10.4	13.0	14.9	16.8	6	10	13	17	19	22
Barnesville	20	5.3	7.9	9.6	11.8	13.4	15.1	7	11	14	17	19	22
Cambridge	30	5.1	7.3	8.7	10.5	11.9	13.2	6	10	12	15	17	19
Clarington Lock	29	4.7	7.3	9.0	11.2	12.8	14.4	6	9	11	13	15	17
Marietta	21	4.1	5.9	7.1	8.7	9.8	10.9	5	7	9	10	12	13
McConnelsville	29	5.4	7.7	9.1	11.0	12.3	13.7	6	9	11	13	15	17
New Lexington	27	5.7	8.8	10.9	13.6	15.5	17.5	7	11	14	17	20	23
Philo	30	4.4	6.2	7.4	9.0	10.1	11.2	5	8	10	12	14	15
Senecaville	30	5.3	7.6	9.1	11.0	12.4	13.9	7	10	13	16	18	20
Summerfield	19	5.3	8.0	9.8	12.1	13.7	15.4	5	8	10	12	14	15
Tom Jenkins Dam	15	6.3	9.2	11.2	13.6	15.4	17.2	7	11	13	16	19	21

TABLE 8 (continued)—Statistics on Maximum 24-hour Snowfall and Maximum Snow on the Ground for Selected Ohio Locations.

		Snowfall (Inches) Mean Recurrence Interval in Years					Snow Depth (Inches) Mean Recurrence Interval in Years					
	n	2	5	10	25	50	100	2	5	10	25	50	100
Central Hills													
Ashland	30	5.4	7.7	9.2	11.1	12.4	13.8	7	10	12	15	16	18
Centerburg	22	5.0	6.6	7.6	8.9	9.8	10.8	6	9	11	13	15	17
Charles Mill Dam	30	5.3	7.5	9.0	10.8	12.2	13.6	7	10	12	14	16	18
Coshocton	30	5.4	7.8	9.5	11.5	13.0	14.6	6	10	12	15	18	20
Fredericktown	27	5.1	7.0	8.3	9.8	11.0	12.1	7	9	11	14	15	17
Mansfield	30	4.7	6.8	8.2	9.9	11.2	12.4	6	8	10	12	14	16
Millersburg	30	4.9	7.2	8.6	10.5	11.9	13.2	6	9	11	13	15	17
Wooster	30	4.9	6.9	8.3	9.9	11.2	12.4	6	9	11	13	15	17
Northeast Hills													
Cadiz	17	5.6	7.8	9.2	11.0	12.3	13.7	6	10	12	15	17	19
Canfield	23	5.6	8.2	9.9	12.0	13.6	15.2	8	12	14	18	20	23
Dennison	30	5.1	7.2	8.6	10.3	11.6	12.9	6	9	11	13	15	17
Millport	30	5.0	7.3	8.9	10.9	12.3	13.8	7	11	14	17	19	22
Steubenville	28	6.4	9.2	11.1	13.4	15.2	16.9	7	12	15	18	21	24
Southwest													
Chilo	30	4.0	6.1	7.5	9.3	10.6	11.9	4	7	8	10	12	13
Cincinnati	30	4.8	6.7	8.0	9.7	10.9	12.1	5	8	9	11	13	14
Dayton	24	5.3	7.6	9.1	11.0	12.5	13.9	6	9	11	13	15	17
Eaton	24	5.4	7.6	9.0	10.9	12.3	13.6	6	9	11	13	14	16
Franklin	23	4.2	6.2	7.5	9.1	10.3	11.5	5	7	9	11	12	14
Hamilton	30	4.9	6.8	8.1	9.7	10.9	12.1	5	8	9	11	12	14
Hillsboro	30	5.2	7.0	8.2	9.7	10.8	11.9	6	9	11	14	15	17
Wilmington	30	5.5	7.8	9.3	11.3	12.7	14.1	8	11	14	17	19	22
Xenia	30	4.4	6.3	7.5	9.1	10.2	11.4	5	8	10	12	14	15
South Central													
Carpenter	13	4.9	7.0	8.4	10.2	11.5	12.8	5	8	10	12	14	16
Chillicothe	30	4.4	6.1	7.2	8.6	9.7	10.8	5	7	9	11	12	13
Gallipolis	30	4.5	6.6	8.0	9.7	11.1	12.4	5	7	9	11	13	14
Ironton	30	3.9	5.8	7.1	8.7	9.9	11.1	4	6	8	10	11	12
Jackson	30	4.9	7.2	8.7	10.6	12.0	13.4	6	8	10	12	14	15
Peebles	30	4.1	5.9	7.1	8.6	9.8	10.9	5	7	8	10	12	13
Portsmouth	30	3.8	5.4	6.5	7.8	8.8	9.7	4	6	8	10	11	12
Waverly	30	4.8	7.1	8.6	10.5	11.9	13.4	6	9	11	14	16	18

Thom (9), using water equivalent data from 140 locations within the conterminous United States, has drawn maps depicting snow loads in pounds per square foot on the ground for 2-, 10-, 25-, 50-, and 100-year mean recurrence intervals. Thom's map range for snow loads with a mean recurrence interval of 50 years in Ohio is about 15 pounds per square foot near the Ohio River in southwest and south central areas to 20 pounds in the extreme north. This latter figure would be most conservative for the snowbelt counties.

Much confusion exists concerning the meaning of extreme value statistics; e. g., the 24-hour extreme snowfall with a mean recurrence interval of 25 years at Lima is 11.1 inches. On Jan. 13, 1964, Lima recorded 18.0 inches of snow and on Nov. 3, 1966 (2.8 years later), they received 12.0 inches. In looking at such data, one might begin to question the 25-year recurrence interval. Before doing so, however, one should determine the probability, P(x), that a snowfall or any extreme event with a recurrence interval, T, will happen within x years from the equation:

$$P(x) = 1 - \exp(-x/T) \qquad [2]$$

For the above example, equation [2] becomes:

$$P(x) = 1 - \exp(2.8/25) = 1 - .89 = 0.11$$

Therefore, there is a 11% chance that a snowfall $\geq$ 11.1 inches can occur within an interval of 2.8 years. So the probability of such rare events occurring within this short period of time is not so unusual after all. To be 95% sure of estimating the time interval between the Nov. 3, 1966, storm and the next snowfall $\geq$ 11.1 inches, it is necessary to solve equation 2 for x which is 74.9 years.

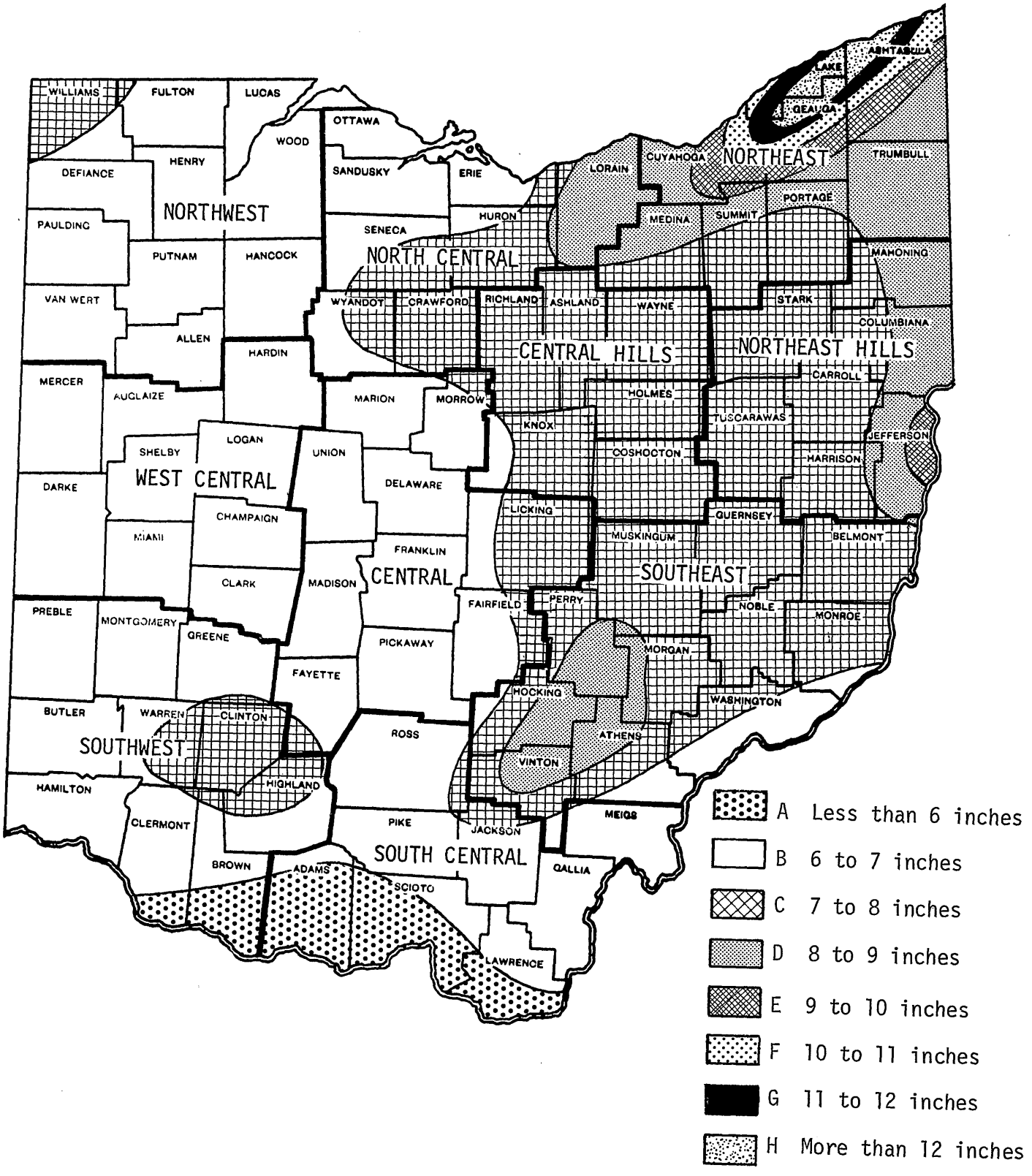

Fig. 5.—Twenty-four hour snowfall (inches) with a mean recurrence interval of 5 years.

SOME NOTABLE SNOWSTORMS

Using several sources but mainly those in (1, 6, and 12), some comments related to notable Ohio snows are presented in chronological order.

1780 Snow fell in the Muskingum Valley to a depth of 2 feet but it was gone in 8 days.

1792 Snowfall for January was estimated by Governor Sargeant at 24.0 inches.

1816 An Urbana newspaper in 1916 carried a story which told of a man and his girl who started for a Fourth of July celebration but were compelled to turn back on account of a snowstorm.

1818 On Feb. 3-4, about 18 inches of snow fell at Marietta.

1841 A snowstorm of rare violence occurred on May 2 in Ashland County.

1855 During the winter of 1854-1855, snow covered the ground for 13 consecutive weeks. On May 8 there was a great snowstorm.

1856 During February snow cover accumulated to 4.5 feet at New Waterford.

1883 On May 21, considerable snow fell in the western portion of the state, notably at Dayton, 2.0; Upper Sandusky, 3.0; Sidney, 7.0; Sandusky, 3.0; Lima, 15.5; and Wauseon, 6.5 inches.

1886 A very heavy snowfall for April occurred on April 5-6 over the northern two-thirds of the state. Amounts ranged from 8.8 inches at Garrettsville to 22.0 inches at Jacksonburg.

1901 A blizzard occurred in eastern Ohio April 19-21. From Fairfield and Licking Counties to Ashtabula, snowfall totaled 12 to 31 inches.

1906 On Oct. 10-11, up to 6 inches of snow fell in eastern Ohio. In most places it was the first time that snow fell with the first autumn freeze.

1910 Heavy snowfall occurred during the winter of 1909-1910 throughout the state, with amounts ranging from about 35 inches in southern counties to about 125 inches in the northeast.

1912 Several locations in northwestern counties reported 13 to 15 inches of snow on Feb. 21-22.

1913 There were severe storm conditions in the northeast and eastern areas on Nov. 9-11. Total snowfall in Cleveland was 22.2 inches. Throughout eastern Ohio, 10 to 25 inches of snow fell. The following locations reported 20 inches or more of snow: Akron, 20.0; Summerfield, 23.0; Hiram, 20.5; Columbiana, 20.5; Medina, 22.0; Cadiz, 20.0; Hudson, 22.0; and Cambridge, 24.0.

1918 Most snow fell for a January since the beginning of official records in 1891. A few stations reported some snowfalls of 10 inches but most storms were not very notable. It snowed often and was very cold.

1926 Up to 14 inches of snow blocked roads north of a Wapakoneta to Willoughby line on Dec. 25-26. South of this line, an ice storm did severe damage.

1939 Drifts of 4 to 5 feet were reported in northwestern counties on Jan. 30.

1940 Heavy snowfall on Feb. 13-14 caused many roads to be blocked for several days. Drifts as high as 20 feet were reported in the mining area of eastern Ohio.

1945 Snow and drifting was widespread and heavy in northern areas during January. On Feb. 1, average depths ranged mostly from 6 to 12 inches in the north and 1 to 6 inches in the south. From Columbus southward, the snow was gone by Feb. 8 but from Delaware northward a covering of 1 to 10 inches remained until Feb. 14. The extended period of snow cover began Dec. 11, 1944.

1948 On Jan. 24, a storm brought 6 to 10 inches of snow in extensive areas across the state from north to south. Youngstown received 17 inches. February snowfall averaged 12 inches in the south to only 4 inches in the north.

1950-1951 Snowstorms during the Nov. 23-28 period broke all snowfall records for November over most of the state both as to depth and duration. Greatest amounts on the ground ranged from 6 inches in the northwest to more than 24 inches in many eastern counties. Geneva reported a maximum snow depth of 33 inches and Steubenville 30 inches. Ohio State and Michigan played their famous football game under real blizzard conditions. Heavy property damage was reported from excessive weight of snow on roofs. Heavy snows were also widespread Jan. 7-8 and 30-31, Feb. 7, March 13-14 and 19.

1954 60 to 70 mph winds accompanied a snowstorm on March 1 and drifts of 5 to 8 feet were common in the north. Hardest hit were Cleveland and northeast Ohio, where thousands of cars, trucks, and buses were marooned.

1960 Snows were heavy and frequent during December. Monthly totals set new records over a broad band extending southwest to northeast across the middle of the state.

1966 A significant late season snow fell in northeast Ohio on May 8. Youngstown received 5.4 inches. The western third of the state received a record-breaking 8 to 14 inches of snow on Nov. 2-3.

Previously such a heavy snowstorm never occurred so early in the fall.

1968 A series of severe snowstorms began Jan. 13 and continued through the 15th. Snowfall amounts in the western half of the state were 5 to 8 inches while eastern areas received 10 to 25 inches.

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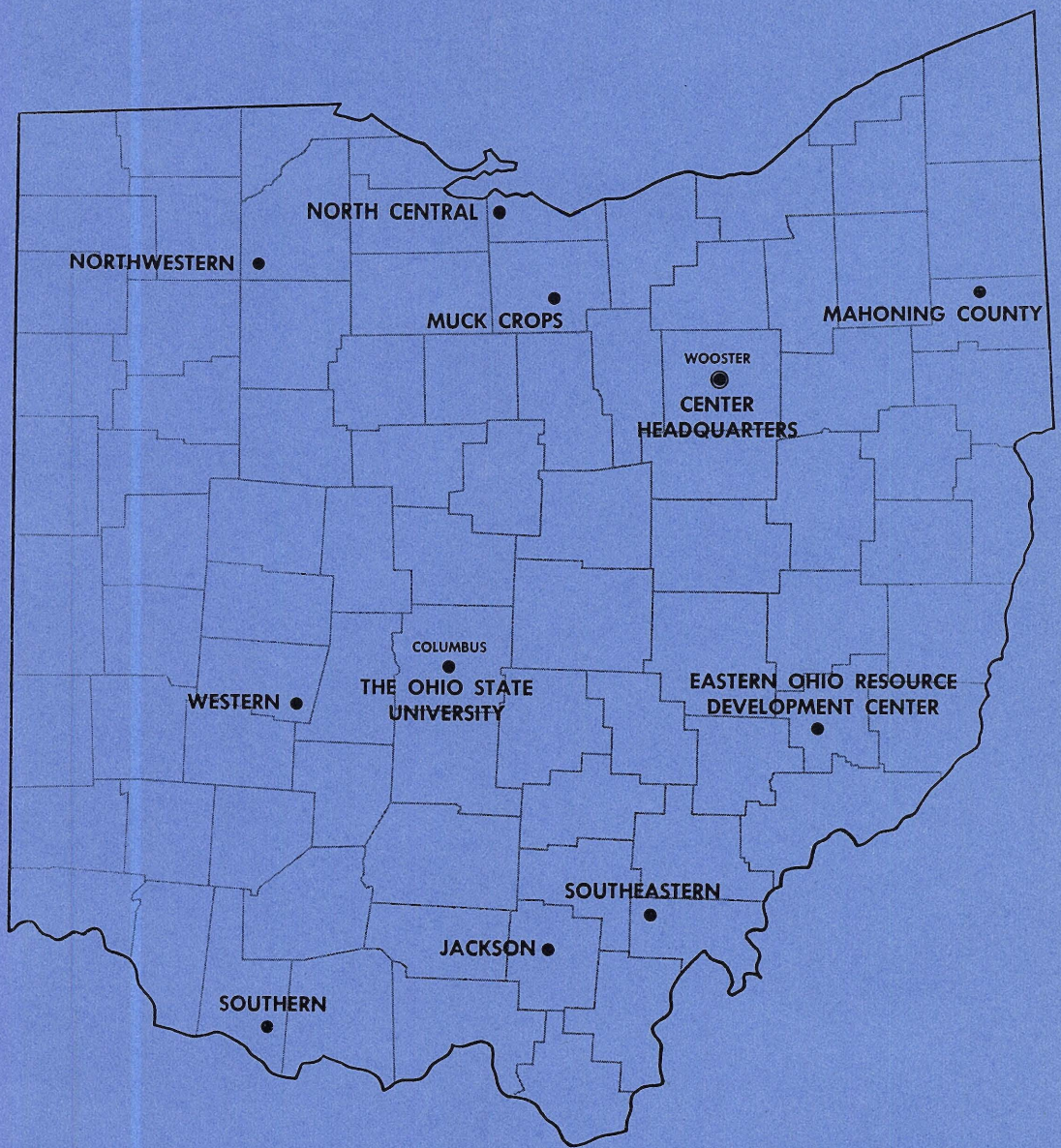
The State Is the Campus for Agricultural Research and Development



Ohio's major soil types and climatic conditions are represented at the Research Center's 11 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 13 departments on more than 6200 acres at Center headquarters in Wooster, nine branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County: 344 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Western Branch, South Charleston, Clark County: 428 acres